MONTHLY WEATHER REVIEW.

Editor: Prof. Cleveland Abbe. Assistant Editor: Frank Owen Stetson.

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INTRODUCTION.

The Monthly Weather Review for January, 1905, is based on data from about 3583 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 4; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; voluntary observers, domestic and foreign, 2565; total Weather Bureau Service, 3258; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Company, 96; Hawaiian Meteorological Service, 1; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Lieut. Commander H. M. Hodges, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San José, Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; and Señor Enrique A. Del Monte, Director of the Meteorological Service of the Republic of Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on local standard time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the Review. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or 10^h 30^m west of Greenwich. The Costa Rican standard meridian is that of San José, 5^h 36^m west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. Garriott, in charge of Forecast Division.

During January an unusually large number of storms passed off to sea by way of Nova Scotia and Newfoundland, and barometric pressures were, therefore, generally low over the western North Atlantic. Pressures were relatively high, in this region from the 6th to the 13th, and from the 29th to 31st, and were high between Bermuda and the south Atlantic coast from the 16th to the 19th. Over the Azores, pressures were generally high, except from the 12th to the 15th, when a disturbance of considerable strength moved northeastward over the islands. The observatory at Horta reported a minimum pressure of 29.40 inches on the 13th, and a maximum wind velocity of 48 miles an hour on the 14th. Over the British Isles, pressures were high from the 1st to the 4th, low from the 5th to the 12th, high on the 13th, low from the 14th to the 20th, and generally high during the remainder of the month. The storm that passed over the Azores on the 13th reached the Irish coast with much increased intensity on the 14th, when Valencia reported a barometer reading of 28.82 inches. During the passage of this storm high winds and gales were reported from all coast stations of the United Kingdom, and considerable damage was sustained by shipping, particularly by small fishing craft.

In the United States several storms of moderate intensity passed along the Gulf coast, and then up the Atlantic coast, increasing somewhat in strength as they progressed. A number of storms passed over the northern part of the country and off to sea by way of the north Atlantic coast. On the 3d a storm center that had traversed the Missouri and Ohio valleys, increasing in strength, reached the Virginia coast with central pressure 29.38 inches. It then passed up the Atlantic coast; at 8 a. m. of the 4th the center was off the Massachusetts, and at 8 p. m. off the Nova Scotia coast. Rain preceded this storm in the New England and Middle Atlantic States, turning into snow with rapidly falling temperature. The snowfall was heavy and drifted badly in many localities, delaying traffic on steam and electric roads. New York City and vicinity suffered particularly in this respect. The winds along the coast reached velocities as high as 60 miles an hour and occasioned some loss to shipping. Ample warnings had been given of the approach of this storm. On the 25th a storm center that had traversed the Lake region, and another that had moved up the Atlantic coast, united off the New Jersey coast and formed a disturbance of considerable strength. This storm center moved up the coast, increasing in intensity, and at 8 p. m. was central over Cape Cod. At 8 a. m. of the 26th it was near Sydney. High winds were reported along the middle Atlantic and New England coast and a number of vessels was driven ashore. Some damage was sustained but no lives were lost. Heavy snow drifted by high winds delayed railroad and street car traffic in many places, and the low temperature which accompanied the snow and wind caused much inconvenience and in some cases loss of life. Ample warnings of this storm had been given by the Weather Bureau, and by keeping vessels in port, shipping interests avoided serious loss. Very few storms appeared off the Pacific coast during the month, and these were unaccompanied by winds of great violence.

The first cold wave of the month appeared over the Dakotas

and Minnesota on the 2d. On the 3d it covered Minnesota, Iowa, Illinois, Indiana, Ohio, West Virginia, and western Pennsylvania. On the 4th, it reached the Atlantic coast, and freezing temperatures were reported into northern Florida. On the 9th a cold wave covered Minnesota, the Dakotas, and northern Nebraska with temperatures of zero or below. On the 10th it extended over the Ohio and upper Mississippi valleys, with the line of zero temperature extending into northern Illinois, Indiana, and Ohio. This cold wave lost its intensity before reaching the Atlantic coast. From the 10th to the 12th temperatures were falling gradually but steadily over the region between the Mississippi River and Rocky Mountains, and the 13th, 14th, and 15th freezing temperatures occurred to the southern Texas coast. On the 15th and 16th temperatures of freezing or lower occurred along the east Gulf coast and into northern Florida. The most severe cold wave of the month appeared over the Dakotas, Minnesota, Nebraska, and Iowa on the 24th, and on the 25th covered the central and upper Mississippi Valley and extended over the northern portions of the east Gulf States, the line of zero temperature reaching into northern Tennessee. On the 26th, the cold wave covered Florida, and temperatures below freezing were reported as far south as Tampa and Jupiter. At the latter place the minimum temperature, 24°, equaled the lowest ever recorded since the establishment of the Weather Bureau station at that point, the lowest previous minimum having occurred December 29, 1894. Considerable damage was done to orange trees where groves could not be fired or protected. Ample warnings had been given of the expected low temperatures, and the Morning Tribune of Tampa in an editorial of January 26, estimates that—

> but for the prompt and ample warnings given by the Weather Bureau office, and the precautions immediately taken upon receipt of these warnings by farmers and growers, the damage would have been about ten times what it really is.

Temperatures during the first decade of the month were generally below normal east of the Rocky Mountains and about normal to the west. During the second decade they were above normal in the Pacific coast States and generally below in all other portions of the country. During the third decade temperatures were above normal in the Pacific coast States and the Rocky Mountain and Plateau regions, and below normal over the Mississippi Valley and eastward to the Atlantic.

The precipitation during the month was above normal in New England, on the east Gulf coast, and in the Southwest, and generally below normal in other parts of the country. On the north Pacific coast the month was remarkably dry.

NEW ENGLAND FORECAST DISTRICT.

The weather was considerably colder than the average for the month. The precipitation, generally snow, was somewhat in excess, except in Connecticut, where it was generally below the average. Several severe storms passed over the section during the month, the most conspicuous of which were those of the 3d–4th, 6–7th, and 24–25th. The first and last of these were accompanied by snow, with high winds and gales, while that of the 6–7th was attended with snow, sleet and rain, and severe gales. Shipping, railroad and street-car traffic, and business generally were greatly delayed and inconvenienced by the stress of weather, and several persons perished in and about Boston from exposure to the stormy weather and low temperature. The storm of the 24–25th was of unusual severity, and the gales, on account of the accompanying very low temperature and heavy snow, were considered the worst since the hurricane of November 26–27th, 1898. The storm resulted in great damage to property, but in little, if any, loss of life. Not less than fifteen vessels were driven ashore along the New England coast, and beach property throughout the coast suffered great damage, the loss amounting to millions of dollars. The fact that Minots Ledge Lighthouse, distant about 20 miles from Boston, was threatened, gives some idea of the unusual force of the wind and the water. The storm warnings during the month, thirteen in number, were issued well in advance of the storms, and resulted in the saving of many lives and prevented the loss of much property. No storms passed over the district for which warnings were not issued.—*J. W. Smith, District Forecaster.*

WEST GULF FORECAST DISTRICT.

January was a wet, cold, and disagreeable month. High northerly winds, for which warnings were displayed, occurred on the coast on a few dates. Extensive and decided cold waves, for which timely warnings were issued, covered the entire district between the 11th and 14th and between the 24th and 26th. Warnings of frost and freezing temperatures were issued for the sugar, truck, and fruit sections along the coast on several dates, and no critical temperatures occurred without timely warnings.

The Daily States, New Orleans, of January 27, 1905, in commenting on the cold weather of the 26–27th, says:

> The Weather Bureau distributed timely warnings, stating almost the exact degree of temperature recorded. This, when it is considered that 21.8° broke all previous records for the last ten days of January, shows that the Weather Bureau forecaster can be depended on not only under ordinary conditions but in exceptional cases.
>
> The public was warned to protect vegetation and drain exposed pipes, and those who failed to heed the warning have suffered accordingly, for unprotected vegetation and pipes have been injured. The warning was of a value far beyond estimation to the masses who look for the information and protect accordingly.

I. M. Cline, District Forecaster.

NORTH-CENTRAL FORECAST DISTRICT.

The month was colder than usual over the greater portion of the district. The temperature was moderate early in the month, but after the first week, cold weather prevailed. The changes thereafter were not very important, and consequently cold-wave warnings were infrequent. Considerable snow fell, and the winter wheat region remained well covered during the larger portion of the month. No exceptionally heavy snowstorm occurred, however. Advisory messages were sent to open ports on Lake Michigan in advance of the few storms that passed over the Lake, but these storms were not usually of a decided character, and no casualties were reported.—*H. J. Cox, Professor and District Forecaster.*

ROCKY MOUNTAIN FORECAST DISTRICT.

Forecasts were issued from day to day for the precipitation that occurred in connection with the southwest low of the 8–12th. In western Colorado and northern Arizona the snowfall was heavy; in other parts of Arizona heavy rains were continuous, causing extensive washouts on the railroads and delaying traffic for a number of days.

The cold waves were few and local in character, and there was no prolonged severe cold. Warnings were issued on the morning of the 11th for the cold wave that visited western Colorado and northern Arizona during the night of the 12th.

Cloudy weather with fog was a feature of the month, and the percentage of sunshine was proportionally small.—*F. H. Brandenburg, District Forecaster.*

NORTH PACIFIC FORECAST DISTRICT.

January in this district was mild and deficient in precipitation, and the winds, on the whole, were quiet. From the 9th until the close of the month a succession of high pressure areas of great magnitude and of slow movement were the dominating features in the Middle West. These high-pressure areas blocked the eastward progress of the north Pacific lows with the result that their movements were irregular and their behavior unusually erratic.

During the early morning of the 25th a severe squall, accompanied by thunder and lightning, swept down the Willamette Valley and thence north to Puget Sound. The wind rush was of short duration and fortunately no casualties of consequence resulted therefrom.

On the 13th, 14th, and 15th high easterly winds of a local character occurred on the Strait of Juan de Fuca, for which timely warnings were issued during the afternoon of the 12th. Warnings were also issued on other dates, and they were generally verified, although the justifying velocities were not greatly exceeded.—*Edward A. Beals, District Forecaster.*

SOUTH PACIFIC FORECAST DISTRICT.

The month as a whole was one of good rainfall and moderate temperatures. There were but few severe storms and no serious frosts. From an agricultural standpoint the month was all that could be desired, although in portions of the Sacramento Valley heavy rains resulted in broken levees and the overflowing of much grain land.

During the first decade the depressions apparent on the north Pacific coast moved northeastward, and this as a rule means pleasant weather in California. On January 9 a disturbance moved in over southern California. This was anticipated in the forecasts. This disturbance followed an easterly course and played an important part in connection with the great high of January 12. A depression of some depth appeared on the Washington coast on January 13 and marked a distinct change in pressure distribution. Somewhat similar types followed during the remainder of the month.—*Alexander G. McAdie, Professor and District Forecaster.*

RIVERS AND FLOODS.

Owing to the continued cold weather of January there was no material change in the ice situation, except a gradual increase in the thickness of the ice and an extension of its southern limit into middle and northern Virginia and the upper Tennessee watershed. At the end of the month there were 30 inches of ice at Moorhead, Minn., on the Red River of the North; 22 inches at St. Paul and 11 inches at St. Louis on the Mississippi River; and 24, 14. and 10 inches, respectively, at Bismarck, N. Dak., Omaha, Nebr., and Kansas City, Mo., on the Missouri River; there were also 3 inches of ice on the upper French Broad River at Asheville, N. C., and the river was frozen over at Dandridge, Tenn., for the first time in five years. There was a heavy gorge in the Mississippi River back of Cairo, Ill., and heavy ice from the lower Ohio was passing Memphis, Tenn.

There were no floods of any considerable magnitude east of the Rocky Mountains, although the heavy rains of the 11th and 12th in the South caused a decided rise in the rivers of Alabama. Warnings that were issued at the proper time were remarkably accurate, and were the means of saving a large amount of property, especially lumber. While the stages reached did not exceed the danger line except in the Tombigbee basin, yet the long duration of the low-water season made the warnings of unusual benefit and importance.

The warm rains from the 20th to the 22d in northern California extended well up into the snow regions of the Sacramento watershed, and as a result the accumulated snow of the winter was melted and carried down into the Sacramento River. Warnings of the flood were issued on the 22d, and the people in the threatened districts in Glenn and Colusa counties made all preparations possible. In Colusa County, however, weak levees were broken, while the waters washed over others, destroying 25,000 acres of growing grain, practically all of this year's crop. At Red Bluff the highest stage reached was 24.5 feet, 1.5 feet above the danger line, while at Colusa it was 28.3 feet, 3.3 feet above the danger line, 0.2 of a foot above any previous record.

The Columbia River was unusually low, and steamboat traffic was absolutely suspended above the mouth of the Wenatchee River.

The highest and lowest water, mean stage, and monthly range at 268 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during January are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon voluntary reports from meteorological observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Cold, wet, and unfavorable for farm work. Excessive rains of 11th and 12th washed lands badly in many localities and caused rivers to overflow lowlands. Very little more wheat and oats were sown; the fall sown was damaged by severe freeze during middle of last decade, when temperature was as low as 17° to the Gulf coast. Fruit trees and strawberry plants continued in good condition. Very little truck land was prepared.—***F. P. Chaffee.***

Arizona.—The month was warm and wet. Snowfall in mountains greater than for years, assuring abundant water supply. Range feed plentiful and cattle in splendid condition. Winter wheat well advanced, though retarded in growth by snow covering in northern counties. Plowing for spring wheat and barley extensive in south-central counties, and some seeding done. Excessive rainfall interfered with mining and caused some damage to railways and dams. Oranges and lemons marketed. Large yields of garden truck in southern counties.—***L. N. Jesunofsky.***

Arkansas.—The temperature was considerably below normal, while the precipitation was slightly in excess. There was more than the usual amount of snowfall. Very little progress was made in farm work. Small grain did fairly well, but the acreage was small. Stock was healthy, but in poor condition, except where fed. Fruit sustained no material injury from low temperatures.—***Edward B. Richards.***

California.—The temperature was considerably above normal most of the month, but severe frosts occurred in some sections, with very little injury to crops. The rainfall was abundant in all sections and thoroughly saturated the soil. There was some damage to grain by the overflow of rivers in portions of the Sacramento Valley. On the whole, crop conditions were better than at last report, and far better than at this time last year.—***Alexander G. McAdie.***

Colorado.—Live stock remained in fair condition, notwithstanding the cold spells, except over areas in the western valleys, where the ranges were poor. Stock water was ample. Snowfall was about normal, except in the northwestern part of the State, where a deficiency was reported. On January 31 there was about one-third more snow than a year ago at high elevations on the upper drainage areas of the Grand and Gunnison, and double the amount of a year ago on the watershed of the Arkansas and South Platte, while for the Rio Grande there was a marked excess.—*F. H. Brandenburg.*

Florida.—With one exception, in 1893, the month was the coldest January since the Climate and Crop Service was established, and, except in 1886, it was the coldest January in Jacksonville since the establishment of a weather station in that city. In many sections the previous minimum temperatures were reached. The greatest damage befell vegetables. The tenderer kinds, such as beans and tomatoes, were killed where not protected; the hardier kinds, such as onions, cabbages, celery, English peas, turnips, and cauliflower, were damaged about one-half. Considerable unprotected fruit was frosted. Some young trees will die, but, as a whole, orange groves suffered only the loss of foliage. Pineapples on the mainland were severely damaged; those on near-by islands escaped serious consequences. The month was deficient in moisture.—***A. J. Mitchell.***

Georgia.—Month noted for sudden and decided changes in temperature; first few days springlike, rest of time temperature below normal; severe cold wave 25th and 26th, temperature near zero in northern section. Rainfall somewhat below normal, smallest average in the central section; light snowfall in northern half 29th and 30th. Cold weather prevented farm work, except in southern section, and injured grains, some late oats killed; outlook still good; seeding spring oats progressing. Fruit prospects unimpaired; trees in good condition.—***J. B. Marbury.***

Idaho.—The month was warmer than any previous January on record, except that of 1900, and there was a marked deficiency in precipitation. The snowfall in the mountains was unusually light and shortage of water was feared. Winter grain was in good condition. Fruit trees did well, except that some buds were swelling prematurely. Hay was abundant and stock was in good condition.—***Edward L. Wells.***

Illinois.—A sleet storm of unusual severity occurred on the 12th, the precipitation freezing into a covering of ice. It was difficult to determine the condition of wheat at the end of the month, a good portion of the crop being covered with ice and snow. Opinion, however, was freely expressed that probably considerable damage had ensued. The plant entered winter mostly in a weak state, due to adverse fall conditions, and had not attained sufficient vigor to withstand the rigors of severe weather.—*Wm. G. Burns.*

Indiana.—Three cold waves crossed the State during January and the mean temperature of the month was 4.9° below normal. Precipitation was also deficient, but was mostly in the form of snow, which furnished clover and fall sown crops partial protection during the extreme cold weather. Wheat on high ground was uncovered by winds and suffered in spots, but generally the crop, while not very promising, was in better condition at the end of January than at any previous time since it was sown.—*W. T. Blythe.*

Iowa.—This has been the coldest January experienced in Iowa since 1893. There were no general thaws to lessen the height of snow drifts, and the soil was well protected in all parts of the State. This was favorable for winter grain and grasses, though not so good for grazing cattle in the corn fields. As a whole the month was favorable for usual farm operations and feeding stock.—*John R. Sage.*

Kansas.—Wheat was well covered with snow after the 10th. It was in fine condition in the western counties, in good condition in the northern and central counties, and in favorable condition in the eastern counties, but was in poor condition in three southern counties. Corn was nearly all gathered. Cattle were doing well, and stockwater was increasing.—*T. B. Jennings.*

Kentucky.—Temperature below normal. Precipitation generally sufficient. Wheat and rye in better condition, but still showing some effects of fall drought. Some damage from cold where snowfall was light. Tobacco stripping made good progress, but color not up to expectation, little delivered. Stock in fair condition. Fruit prospects favorable.—*F. J. Walz.*

Louisiana.—Weather conditions during the month were not favorable for agricultural operations. Low temperatures interfered with out-door work, and there was too much rain in some localities. Preparations for cotton, corn, and rice crops were not well advanced. Winter oats and rye suffered in some localities from freezing weather. Truck gardens and berries, where not protected, were injured by cold weather. Seed cane continued in very good condition, but planting was interfered with by wet, cold weather.—*I. M. Cline.*

Maryland and Delaware.—January temperatures averaged 3° below normal, with maximum of 69° on the 1st, and minimum of 14° below zero on the 31st. Precipitation was above normal, and snowfall was very heavy. The heavy snow of the 25th drifted badly, exposing fields and blocking roads. Little farm work was done. Wheat was somewhat damaged by alternate freezing and thawing; late wheat was more affected, because poorly rooted. Some tobacco was seeded. Grasses, fruit trees and stock wintered well.—*Oliver L. Fassig.*

Michigan.—Winter wheat and rye were well protected by a good snow blanket during practically the entire month of January. A few correspondents who carefully investigated wheat by digging through the snow reported that it had a vigorous and healthy appearance and seemed to be making a good winter growth. The snow was somewhat crusted on top, and the average depth on the 15th and 31st of the month was about five inches.—*C. F. Schneider.*

Minnesota.—There were cold periods from the 8th to the 16th, and from the 22d to the end of the month. The monthly mean minimum temperature at every station except Worthington was below zero. The maximums occurred for the most part on the 1st. The precipitation was all snow and the amount was slightly above the normal. The State was covered with snow all the month. A splendid ice crop was being gathered all the month.—*T. S. Outram.*

Mississippi.—The month was unusually cold, with considerable freezing weather. The soil was frozen to the coast line on the 26th. Rains were frequent and general, but excessive in only a few localities. Light snow occurred in the northern counties. Very little farm work was done during the month, owing to the unfavorable conditions. Oats were injured by the freeze on the 26th.—*W. S. Belden.*

Missouri.—Winter wheat was well protected by snow during the greater part of the month, and, while the actual condition was unknown at the close of the month, the consensus of opinion was that the crop had not deteriorated. The cribbing of corn was practically completed. The grain was in good condition and graded well. Some injury to fruit buds by severe cold.—*George Reeder.*

Montana.—January was unusually mild, except during two brief periods, when temperatures below zero occurred in all sections. Light snows occurred at frequent intervals, furnishing water for stock; the ranges, however, were clear of snow the greater portion of the month. There were no storms injurious to stock. Cattle and sheep were in good condition throughout the month and the ranges in most sections afforded all the feed necessary.—*R. F. Young.*

Nebraska.—The ground was well covered with snow after the 10th, furnishing effective protection to the wheat from the low temperatures of the month. This made the prospects for wheat rather better than at the end of December. Practically no farm work was done. All stock continued in good condition.—*G. A. Loveland.*

Nevada.—The weather of the month was remarkably dry and unusually mild. Range stock did well throughout the month. The snow conditions at the close of the month were generally satisfactory, and a good flow of water seemed assured for the coming season.—*J. H. Smith.*

New England.—The weather of the month was colder than usual, and the temperature was continuously low, there having been no "January thaw." Several severe storms passed over the district, the most notable of which were on the 3d-4th, 6-7th, and 24-25th. The weather conditions were favorable to the lumbering interests and to ice harvesting. The covering of snow on the ground throughout the month was favorable to grass and winter grain and to bulbs and roots in the ground.—*J. W. Smith.*

New Jersey.—At the close of the month a blanket of snow from twelve to twenty inches in depth covered the ground. Wheat, rye, and grass continued in good condition, except in portions of the southern section, where alternate freezing and thawing did some injury. Fruit trees continued dormant.—*Edward W. McGann.*

New Mexico.—Mild, wet month, especially first half. Soil well moistened and in excellent condition for early plowing, seeding, range, and abundance of water. Alfalfa and fruits apparently wintering well. Range poor in northeast counties, and some loss of cattle and sheep, but, generally, stock in fair to good condition and farmers and ranchmen confident of very favorable coming season. Mountains heavily laden with snow, but valleys and southern slopes generally bare at close of month.—*Charles E. Linney.*

New York.—The month was moderately cold, with little heavy snowfall, except in the southeast portion. Winter grains and grass were generally well protected by snow and in good condition, except in sections of the central and eastern portions of the State. Fruit buds were uninjured by freezing. Live stock was wintering well and seemed to be in good condition. The ice harvest was about completed.—*H. B. Hersey.*

North Carolina.—The month was quite unfavorable for farm work and the growth of crops on account of the continuous cold weather. Farming operations ceased entirely. The severe freeze of the 25th to 27th killed much late seeded winter wheat and oats that were just up, and at the close of the month the condition of both crops was poor, with little evidence of growth. Early sown crimson clover did well, late sown was poor. There was slight damage to truck crops under glass.—*C. F. von Hermann.*

North Dakota.—The month was generally favorable for live stock, especially on the ranges in the western part of the State. In that section the snow on the ground was not deep enough to prevent grazing on the prairies, while it afforded ample moisture to satisfy thirst.—*B. H. Bronson.*

Ohio.—The month was cold and dry. Wheat was benefited by the precipitation near the last of December. It was well protected by snow over most of the State during the coldest weather in January. There was but little corn remaining in the field at the end of the month. Rye was in good condition. The weather was favorable for the stripping and handling of tobacco. Fruit buds were in good condition.—*J. Warren Smith.*

Oklahoma and Indian Territories.—Cold waves of 10th and 24th caused marked departures from daily average temperature and made the month the coldest January on record. Precipitation was above average and, occurring in form of sleet and snow, materially benefited wheat and placed ground in fine condition for plowing and seeding. Stock in good condition, but suffered somewhat during cold periods. Fruit trees in good condition.—*C. M. Strong.*

Oregon.—No cold spells sufficiently severe to harm fall grain occurred, and at the close of the month fall wheat, fall oats, alfalfa, clover, vetch, and cheat were in excellent condition. Pasturage was as good as usual at this season of the year, and stock in many sections was able to obtain a living without being fed hay. Fruit trees continued in fine condition. *Edward A. Beals.*

Pennsylvania.—With the exception of 1904, this was the coldest January since 1893. The average precipitation was the heaviest since 1898 and was very unevenly distributed. The snowfall was materially above the normal. Winter grain was generally well protected and was thought to be uninjured, except in the southeast section, where high winds during the latter part of the month exposed many fields and covered others with heavy drifts which may prove damaging.—*T. F. Townsend.*

Porto Rico.—Rainfall fairly well distributed and generally sufficient. Cane harvesting continued in the southern division; grade of juice better than during same period last year. Grinding began in northern and eastern divisions; grade of juice low. Young canes doing well generally. An unusually large amount of land being prepared for the next cane crop. Cotton yeilding well in most districts; picking and planting in progress. Coffee trees blossoming abundantly. Small crops generally in good condition but not very abundant in markets. Oranges plentiful and of good quality.—*E. C. Thompson.*

South Carolina.—January had one cold wave that damaged oats and truck severely, but did no injury to wheat or to fruits. Some plowing was accomplished. Some oats were sown over the eastern and central counties, but none in the western ones. Less than the usual amount of

SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, JANUARY, 1905.

In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.								Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.						Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	39.0	− 5.7	Daphne, Lucy	77	11	Valley Head	1	25	5.26	+0.62	Uniontown	7.70	Bridgeport	2.20
Arizona	47.3	+ 2.6	Bowie	93	4	Fort Defiance	− 5	13	2.83	+1.71	Pinal Ranch	9.00	Mohawk Summit	0.10
Arkansas	33.3	− 6.5	Amity	73	1, 20	Pond	−13	15	4.58	+0.28	Lake Village	8.69	Dodd City	1.32
California	48.3	+ 2.9	Riverside	87	29	Bodie	−16	1	4.37	−0.06	Upper Mattole	23.56	Bodie	0.10
Colorado	23.7	− 0.2	Cheyenne Wells	69	2	Gunnison	−30	12	0.89	+0.23	Santa Clara	3.21	Wray	0.04
Florida	52.9	− 4.4	New Smyrna	85	12	Middleburg	12	26	1.79	−1.66	De Funiak Springs	7.28	2 stations	T.
Georgia	40.8	− 4.4	St. Marys	78	2	Diamond	1	25	3.21	−0.93	Clayton	7.91	Waverly	1.17
Idaho	28.5	.....	Blue Lakes	61	26	Chesterfield	−18	10	1.16	.....	Lovell	3.73	Lost River	T.
Illinois	20.5	− 5.3	Cisne	67	1	Lanark	−15	25	1.66	−0.58	Raum	3.71	Dixon	0.32
Indiana	23.1	− 4.9	Mount Vernon	74	1	Northfield	−16	10	2.17	−0.71	Marengo	4.40	Northfield	1.21
Iowa	11.2	− 7.0	Keokuk	56	1	Inwood	−30	25	0.91	−0.06	Lacona	1.82	Storm Lake	0.12
Kansas	21.8	− 8.2	Emporia; Cunningham; Jetmore	67; 67; 67	1; 3; 4	Republic	−30	15	0.88	+0.07	Toronto	2.45	Wallace	0.27
Kentucky	27.5	− 6.4	Jackson	70	1	Farmers	−15	26	2.83	−1.05	Mount Sterling	4.31	Anchorage	1.02
Louisiana	45.5	− 4.7	Leesville	82	20	Amite; Calhoun, Ruston; Plain Dealing	−13; −13; −13	16; 26; 26	5.78	+1.13	Covington	8.40	Robeline	2.75
Maryland and Delaware	28.6	− 2.9	Hancock, Md	69	1	Grantsville, Md; Oakland, Md	−14; −14	29; 31	3.80	+0.78	Baltimore, Md., (J. H. Hospital.)	4.72	Boetcherville, Md	1.67
Michigan	16.4	− 3.9	Grape	52	1	Humboldt	−28	3	1.78	−0.54	Eagle Harbor	3.73	Sault Ste Marie	0.64
Minnesota	5.6	− 5.5	Glencoe, Milaca; New Ulm	50; 50	1; 1	Pokegama Falls	−52	10	0.65	−0.09	Luverne	1.60	Red Wing, No. 1	0.04
Mississippi	40.0	− 5.9	Poplarville	77	10	Corinth; Holly Springs	5; 5	26; 25, 26	6.12	+0.69	Hazlehurst	8.95	Biloxi	4.14
Missouri	22.3	− 7.5	Vichy	72	1	Oregon; Warsaw	−19; −19	25; 15	1.79	−0.29	Willow Springs	4.28	Steffenville	0.17
Montana	18.1	− 1.3	Cascade, Livingston	56	25	Glendive	−45	31	0.59	−0.29	Columbia Falls	2.14	Twin Bridges	0.01
Nebraska	17.1	− 5.7	Callaway	65	1	Agate, Bridgeport	−33	13	1.07	+0.59	Fullerton	2.30	Grant	0.17
Nevada	34.5	+ 6.8	Wadsworth	72	29	Potts	−11	12	0.66	−0.95	Eureka	2.60	Hawthorne	0.00
New England*	18.3	− 3.3	Framingham, Mass.	56	1	Van Buren, Me.	−45	15	3.81	−0.31	Durham, N. H	7.60	Cornwall, Vt.	0.96
New Jersey	27.0	− 3.0	Bridgeton, Friesburg.	60	1	Layton	−16	31	4.18	+0.46	Charlotteburg	7.13	Trenton	2.68
New Mexico	35.2	+ 1.1	Carlsbad	80	23	Springer	−16	13	1.14	+0.79	Cloudcroft	3.20	Cimarron	0.26
New York	18.2	− 3.9	Elmira, Waverly	56	1	Paul Smiths	−29	31	3.26	+0.43	Boyds Corners	6.54	Ogdensburg	1.14
North Carolina	36.3	− 3.9	Whiteville	76	12	Linville	− 8	25	3.01	−1.17	Horse Cove	6.53	Kinston	0.85
North Dakota	0.9	− 5.3	Ellendale; Sentinel Butte	48; 48	2; 3	Walhalla	−40	10	0.30	−0.25	Walhalla	0.80	4 stations	T.
Ohio	22.7	− 5.2	Lancaster	65	1	Greenhill	−17	29	1.73	−0.97	South Lorain	2.91	Colebrook	0.57
Oklahoma and Indian Territories.	30.0	− 7.8	Pauls Valley, Ind. T.; Ravia, Ind. T.	72; 72	1; 1	Kenton, Okla; Gage, Okla	−20; −20	13; 15	2.01	+0.64	Blackburn, Okla	5.66	Cleo, Okla.	0.50
Oregon	36.3	+ 1.7	Williams	72	23	Pine	−10	11	3.95	−2.02	Gold Beach	12.87	Joseph	0.18
Pennsylvania	23.8	− 3.2	Claysville	69	1	Smethport	−21	30	3.70	+0.58	Gordon	7.55	Elwood Junction	1.72
Porto Rico	73.6	.....	Juana Diaz	93	4	Aibonito	49	3 dates	4.69	.....	Cidra	17.40	Juana Diaz	T.
South Carolina	41.4	− 4.3	Walterboro	77	1, 12	Greenville	8	26	2.00	−1.57	Walhalla	4.83	St. George	0.30
South Dakota	9.1	− 5.8	Fairfax	62	2	Ramsey	−37	25	0.58	+0.16	Spearfish	1.62	Herried	0.03
Tennessee	31.5	− 6.7	Dover	75	1	Rugby	− 7	25	3.51	−1.22	Santa Fe	5.71	Dyersburg	1.92
Texas	44.0	− 3.5	Fort Ringgold	91	11	Texline	−15	15	1.63	−0.67	Beaumont	6.94	2 stations	0.00
Utah	28.9	+ 2.7	Fillmore	71	25	Fort Duchesne	−22	13	0.86	−0.23	Ranch	3.15	Callao	0.05
Virginia	31.5	− 3.5	Saxe	70	1	McDowell	−15	15	2.87	−0.22	Spottsville	4.07	McDowell	0.72
Washington	34.0	+ 1.8	Zindel	64	28	Twisp	16	11	3.64	−0.52	Union City	14.26	Zindel	0.48
West Virginia	26.4	− 5.0	Doane	70	2	Buckhannon, Weston.; Cario	−14; −14	4; 29	3.15	+0.02	Terra Alta	7.43	New Cumberland	1.48
Wisconsin	8.4	− 6.8	Prentice	52	1	Hayward	−36	10	1.08	−0.04	Sheboygan	3.75	Berlin	0.06
Wyoming	21.1	− 0.2	Hyattville; Marquette	60; 60	25, 26; 25	Lusk	−33	12	0.92	−0.05	Centennial	2.80	Thermopolis	0.05

commercial fertilizers was hauled. The rainfall was copious in the western counties, but deficient in all other parts.—*J. W. Bauer*.

South Dakota.—There was considerable cold weather in the second and third decades, but live stock withstood the low temperature and was generally in good condition and wintering well. The snow on the open ranges was not sufficient to interfere materially with grazing, but enabled stock to satisfy thirst conveniently and thereby permitted ranging at considerable distances from usual watering places. Winter rye and the limited acreage of winter wheat were generally protected by snow.—*S. W. Glenn*.

Tennessee.—The month was very cold, with precipitation decidedly below the normal. Hard freezes occurred from the 14th to 17th and 24th to 27th. There was but little snow until the 29th, when heavy amounts fell. Grains were unprotected in the coldest weather. Early sown wheat and winter oats and rye were in fair condition, but late sown wheat looked weak and seared. Pastures were poor.—*H. C. Bate*.

Texas.—There was generally a deficiency of precipitation over the State, and in some counties the deficiency was very marked; in a few eastern counties, however, there was an excess. Several cold waves occurred during the month. Freezing temperatures occurred to the coast, and below zero in the northwest. Reasonably good progress was made with preparations for putting in new crops. The cold weather damaged growing crops somewhat, but damage was lessened by snow in the north. Drought caused some damage also. The general condition of winter grain, gardens, pastures, and stock was fair to good at the end of the month—*M. E. Blystone*.

Utah.—Abnormally warm weather prevailed, with a great deal of cloudiness. Warm winds swept the snows from the valleys and dried the soil, making possible the plowing of a considerable acreage. Winter grain and the range became green under the springlike weather, and wheat was somewhat revived. The range furnished ample feed for stock.—*R. J. Hyatt*.

Virginia.—The weather of the month was variable, moderate temperatures occurring in the first decade and some hard freezes in the second and third decades. Precipitation was below normal. Fall sown grains, as wheat and oats, also clover and grasses, were insufficiently protected by snow during the month, and some local winter killing occurred. Barley and rye did fairly well. Considerable ice formed, and farmers generally completed ice harvest.—*Edward A. Evans*.

Washington.—The month was mild, with abundant rainfall west of the Cascade Mountains and sufficient snow and rain in the wheat section of the eastern counties. The snow covering over the wheat lasted from

the 12th to the 25th, when removed by rain and warm spell. The moisture soaked in, improving the soil. Early fall sown wheat was in thrifty condition, but the late sown was retarded by dry soil and lack of rain and was not so vigorous.—*G. N. Salisbury*.

West Virginia.—The weather was generally quite cold during the month, and there was considerable snowfall. Wheat and rye were generally well protected, but the prospects were poor. Stock was wintering well, with prospect of sufficient feed. No plowing was done.—*E. C. Vose*.

Wisconsin.—The month as a whole was decidedly cold, the average temperature for the State being but 0.3° above the average for January, 1904, which ranks among the coldest Januaries during the past thirty-four years. The snowfall for the State averaged about thirteen inches and was fairly well distributed. Winter grains and grasses were thoroughly protected during the month by an ample covering of snow.—*W. M. Wilson*.

Wyoming.—A cold wave overspread the State on the 11th, 12th, and 13th, but as it was not accompanied by much snow, stock did not suffer any injury. Another storm and cold wave was quite general over the southern half of the State at the close of the month, and some apprehension was felt in regard to stock. As a whole, the month was favorable for stock, which remained in good condition, with practically no losses reported.—*W. S. Palmer*.

SPECIAL ARTICLES.

ESCAPE OF GASES FROM THE ATMOSPHERE.

By Dr. G. JOHNSTONE STONEY, F. R. S.

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A letter under the above heading by Mr. S. R. Cook, in Nature of the 24th of March, 1904,[1] puts forward views that ought not to remain on record without reply; and as between thirty and forty years ago I carried on the investigation into the rate at which gases can escape from atmospheres in the same way as Mr. Cook has done, and arrived, from the premises employed by him, at substantially the same conclusions, perhaps the best answer will be to state the considerations which led me to distrust that line of argument and finally to abandon it. To do this, however, requires more to be said than can be brought within the compass of a letter to a weekly journal; and on this account, and because the discussion is a physical discussion and concerns one of nature's greater operations, I venture to request for the following pages the hospitality of the Philosophical Magazine.

A study of the phenomena attending the escape of gases from atmospheres has been approached in two ways—*inductively*,[2] by arguing upward from events that are found to have occurred or to be in process of occurring in nature; and *deductively*,[3] by drawing inferences from the supposition that it is legitimate to attribute to the real gases of nature behavior which it has been ascertained would prevail in certain models of gas, so much simpler in their constitution than real gases that the progress of events within them is susceptible of mathematical treatment.

The two methods, as hitherto employed, have led to contradictory results, of which one, at least, must be erroneous. Mr. Cook, who has of recent years employed the deductive method, expresses the opinion in his letter that the numerical results which have been arrived at by this method "will have to stand" until they can be disproved "by other *a priori* reasoning".

Serious students of nature must, I think, hold that man, in his dealings with nature, is not in position to limit in this way the kind of proof he will accept, and that it is sufficient if *in any way* Mr. Cook's inferences from Maxwell's researches can be disproved, whether by valid *a priori* or by valid *a posteriori* reasoning. And, moreover, that when once they are disproved we are brought face to face with the fact that there has been a mistake somewhere in the data which have led those who trusted in them to a false conclusion.

What convinced me several decades ago that the conclusion at which I arrived and at which Mr. Cook has arrived is false, is that it represents the moon as incompetent to get rid of the atmosphere which it originally shared with the earth, and of the gases which it has since evolved in abundance from its own interior. We knew thirty-five years ago, as we know now, that any reasoning which makes out that the moon has retained its atmosphere must have a flaw in it somewhere. Furthermore, since that time other facts not then known have come to light and in a marked degree confirm the judgment which was then formed. Our confidence that we are on the right track is justifiably strengthened when, as in this case, further discoveries as they emerge confirm the view to which we had been led when our materials were more scanty. The presence of helium on the earth was not then known, and the argument[4] which has been based on what is now known of its behavior may be summarized as follows: helium is supplied to the earth's atmosphere through certain hot springs, and under circumstances which indicate that it also oozes up through the soil. It is, however, what is carried up by the water of these springs that can be subjected to experimental examination. The other gases of our atmosphere, such as nitrogen, oxygen, and argon are found to accompany the helium in these springs, but with this marked difference, that whereas the other gases are present in such proportions as are consistent with their merely being portions of those gases which are being returned to the atmosphere after having been washed down into the earth from the atmosphere by rain, the case is entirely different when we come to helium. The quantity of helium passed into the atmosphere through those springs is found to be from 3000 to 6000 times more than can be accounted for as a return to the atmosphere of helium which had been washed down out of it. Accordingly we are justified in regarding this great surplus of helium as being an addition which is being uninterruptedly made to the atmosphere. Notwithstanding this, the quantity of helium in the atmosphere has not gone on increasing. The earth at the present rate of supply furnished in a small number of years a quantity of helium equal to the quantity which the atmosphere can at present retain, i. e., in a number of years which is exceedingly small from a geological standpoint, which is the point of view that is here appropriate. The inference from these facts is the obvious one, that helium is by some agency being eliminated from our atmosphere as fast as it is being introduced into the atmosphere from the earth. Two possible agencies for the elimination of the helium suggest themselves, chemical reactions and an escape of helium from the upper part of the atmosphere. Of these, chemical agency is excluded by the extreme chemical inertness of helium. What remains then is that there is an outflow of helium from the top of the atmosphere equal to the inflow at the bottom, and that the trace of helium that is at any one time present in the atmosphere is helium part of which is slowly making its way upward to the

[1] In the Monthly Weather Review for August, 1902, p. 401, we also have published a very suggestive paper on the above subject by S. R. Cook. But it deals with problems on the very boundary of the present state of our knowledge, and when learned authorities differ we must in all honesty present both sides of the case to our readers. We accordingly reprint Doctor Stoney's conservative conclusions, as showing the need of further investigation before the subject can be considered definitely settled.—*C. A.*

[2] "Of atmospheres upon planets and satellites." By G. Johnstone Stoney, F. R. S. *See* Scientific Transactions of the Royal Dublin Society, vol. 6, p. 305, October, 1897; *or* Astrophysical Journal, January, 1898, vol. 7, p. 25.

[3] "On the escape of gases from planetary atmospheres according to the kinetic theory." By S. R. Cook. *See* Astrophysical Journal, January, 1900, vol. 11, No. 1.

[4] The argument here summarized is based on the marvelous determinations made by Sir William Ramsey, K. C. B., F. R. S., or in his laboratory, and will be found with the necessary details in a paper on the behavior of helium in the earth's atmosphere. By G. Johnstone Stoney, Astrophysical Journal, vol, 11, p. 369, 1900.

situation from which some of its molecules can escape, and so produce that outflow which balances the net influx at the bottom of the atmosphere.

Having satisfied myself that the deductive method as I applied it, and as Mr. Cook has applied it, lands us in erroneous results, I set to work to scrutinize the data of the deductive argument with a view to ascertaining how far they may be depended upon and at what points they are doubtful. All branches of physics require us to be more or less on our guard against trusting without sufficient scrutiny to inferences from that mixture of theory and hypothesis of which we are obliged to make use in order to be able to employ mathematics in physical research. The demand for this caution becomes a pressing one when, as in gases, we are obliged to deal with immense numbers of events, each of which has its own dynamical history with incidents peculiar to itself, and where what chances on some of these occasions differs enormously from that which occurs in most of them. Of this kind are the interactions between the molecules of a gas and the interfused aether, and especially those complicated struggles between molecules which we call their encounters, events each of which, when viewed as it ought to be viewed, from the molecular standpoint, is a battle lasting a long time, as time has to be measured in molecular physics, and with an immense number and variety of incidents. These, the interactions between the molecules and aether, and the interactions between molecule and molecule, are the primary events, the real determining events, which occur within a gas; while the movements of the molecules as they dart about between one encounter and the next, the spectrum radiated by the gas, the ions which present themselves after some of the encounters, the compounds which result from chemical reactions during some of the encounters (if what we are dealing with happens to be a mixture of suitable gases), and, finally, that remarkable partition of energy between the events going on within the molecules and the translational motions of the molecules, which is effected during some of the encounters—all of these are subordinate events depending upon those which are above spoken of as the primary events. When dealing with such almost immeasurably intricate and obscure operations of nature, it behooves us with the very utmost caution to distinguish between what is theory and what is hypothesis in the data we employ, in order to be able to ascertain how far any conclusions we draw follow from the one, and how far they involve the other, with the risks inseparable from it.

Theories are suppositions we hope to be true; hypotheses are suppositions we expect to be useful. As to theories, they are either correct or erroneous. They may be, they usually are, but they by no means need to be, of use to man. The virtue of a theory is simply to be true. On the other hand hypotheses usually make use of machinery which we can see to be simpler than that operating in nature; and especially is this the case with the hypotheses to which we are obliged to have recourse in mathematical investigations, which, in order to be of use, must be so great a simplification of the complex intricacies of nature that human mathematics shall be able to cope with them.

The theory of gas universally put forward in scientific books when the present writer was young was the erroneous statical theory that the molecules of a gas may be stationary, that they have a capacity for expanding and contracting, and that each molecule presses against its neighbors. An illustration frequently made use of in those days was that of a froth of bubbles pressing against one another. This erroneous theory had the field in Avogadro's time, and for more than thirty years afterwards; but in the fifties of the nineteenth century it was gradually, though not without protest, displaced (chiefly through a masterly series of papers by Clausius) by the kinetic theory, which is now the prevalent theory. The kinetic theory of gas, as formulated by Clausius, regards the molecules of a gas as missiles of equal mass, darting about in space and not acting *sensibly* on one another except when "encounters" chance to take place, i. e., not until the centers of mass of two molecules get within an interval of one another, which is less—usually much less—than the average length of the free paths which the molecules describe between the encounters; which free paths are accordingly approximately straight and pursued with unvarying speed, except so far as they may be slightly influenced by gravity or other external cause, or by some excessively minute part of the interactions between molecules, if any such survives when the intervals between molecules get beyond what we may call their encountering distance.

This is the kinetic theory of gas as put forward by its founder,[5] and any system of bodies which conforms to this definition may be called a *kinetic system*. Thus, there are in nature as many kinetic systems as there are distinct gases; and moreover all those models of gas in which the progress of events has been studied by mathematicians *are each of them* a kinetic system. So also are the cosmic bodies of celestial space, if we eliminate from the definition the condition that the masses must be equal; and, in fact, some modification of this clause of the definition is essential, even as regards gases, inasmuch as in all gases of nature there are found some of the missiles differing in mass from others: thus, in diatomic gases ions present themselves with masses that seem to be half the mass of the average molecules.

We may add further details without trespassing beyond the domain of theory, i. e., while still endeavoring to describe events as they occur in nature. Thus, we may add that elaborate internal events are going on within all these missiles, which internal events absorb about one-third of the whole available energy of the gas; and we know that two partitions of energy take place—one a partition of energy (which probably goes on uninterruptedly) between these internal events of the molecules and the events of the aether, the other a partition of energy which now and then occurs with comparative suddenness between the internal events of the molecules and their translational motions. This latter transfer of energy seems to take place only when two molecules are in grip with each other during an encounter, and not at every encounter, but only during those which take place under certain necessary conditions. If, as seems probable, encounters with these special characteristics are as rare as those which result in the breaking down of molecules into ions, or of those which result in chemical reaction in a mixture of equal volumes of chlorine and hydrogen, then the infrequency of their recurrence can be estimated; and, in cases in which it has been found possible to make the estimate, the infrequency seems to range from one out of 10^9 encounters down to one in 10^{15}, when we pursue the observations so far as they have been recorded.

It is here that I strongly suspect, though I am not in a position to claim that I know, that the mistake has been made by Mr. Cook and by my friend Professor Bryan, who both tacitly assume that this partition of energy is a process which goes on uninterruptedly, even in the upper parts of the atmosphere. Whether the mistake be here or elsewhere, as yet may be only highly probable; but that a mistake exists somewhere in the premises of the deductive argument was placed beyond question by nature when she presented to us events that have occurred or are occurring, which negative some of the inferences to which those data lead. We may be unable with certitude

[5] Clausius's papers were preceded by a paper by Waterston, which was presented to the Royal Society in 1845, but which was not then published. This paper, when it long afterwards came to be printed, was found to contain a most valuable anticipation of the kinetic theory as developed by Clausius. If Waterston's paper had been printed in due course the kinetic theory would probably have been adequately dealt with some years sooner.

to put our finger upon the precise spot where the mistake came in, but that mistake has come in somewhere can be proved.

When Maxwell determines his law for the distribution of speeds in a kinetic system, he exercises a caution[6] which has not always been observed by his successors, and is careful to present the law as the law governing the distribution of speeds (not in every, or indeed in any gas), but in a kinetic system which consists of numberless equal particles, each of which is a perfectly rigid and perfectly elastic sphere, after an immense number of collisions have taken place—assumptions which he afterwards varied in different ways, as by substituting particles of other forms, or points repelling one another inversely as the fifth power of the distance. The several assumptions which he thus makes are put forward not as theory but as hypothesis; they do not profess to reproduce any existing gas, but substitute for the gas an artificial model; and Maxwell is careful to keep this prominently before the mind of his reader.

As to his exponential law for the distribution of speeds, it is the solution of a functional equation, which in turn is the expression of the assumption that the number of molecules whose velocities lie between u, v, w, and $u + \delta u$, $v + \delta v$, $w + \delta w$ *must be some function of* u, v, *and* w. Now this is true of Maxwell's models, but can not be the case in any gas in which there is an irruption of energy from the internal motions to the translational on the occurrence of events which depend either wholly or partly on conditions other than the mere translatory speeds of the molecules—such conditions, for example, as the aspects of the two molecules to one another when the encounter is about to take place, or the phases at which the internal motions had arrived at that instant of time, or many other conditions that are possible and can be easily conceived. Accordingly, whenever a mathematician applies Maxwell's law under the impression that, as regard any particular gas, it is more than an approximate law, he tacitly assumes either that there are no internal events (as in Maxwell's models), or that if there be internal events, as in all real gases, the partition of energy between these internal events and the translational motions is a transfer taking place at such short intervals that it may legitimately be treated by the mathematician as a process which goes on continuously and at a constant rate. At the bottom of our atmosphere an event that happens once in 10^9 encounters occurs to each molecule as often as seven or eight times per second. Even here the assumption that the transfer of energy goes on uninterruptedly makes but a rough approximation to the truth, and it is utterly remote from being an approximation in that penultimate stratum of the atmosphere from which nearly the whole escape of molecules takes place, and especially in regard to an event like the escape of a molecule from the earth, which is mainly the outcome of the circumstance that an individual encounter has chanced to be very unlike the ordinary encounters. Hence, in no real gas can the actual law of distribution of speeds be identical with Maxwell's exponential law, nor with any of the exponential laws of Maxwell's successors; although under the conditions which prevail in our laboratories these laws may be an approximation sufficient for many useful purposes.

The cases in which Maxwell's approximate law may legitimately be employed can be pointed out. Whenever an approximate law presents itself in an exponential form with a negative index, the approximation holds good as an approximation over that small part of the range where the exponential function acquires large values, but can no longer be depended upon as an approximation in regard to the parts of the range where the exponential function is small. Maxwell makes a legitimate use of his law when, through its instrumentality, he discovered his remarkable explanation of viscosity and diffusion, and investigated the laws of these phenomena. In reference to these, what happens in the case of velocities which are infrequent is of small account; but the application made by Professor Bryan and Mr. Cook is to the rare events which occur within that part of the range where the approximation breaks down, and where, in consequence, the exponential law is misleading. It is to this oversight to which I think it likely that we are mainly to refer numerical results which are found to clash with events that have taken place or that are taking place upon the moon and on the earth.

The inquiry in which I engaged in the sixties of the last century led also to the detection of other defects in the premises made use of by those who have trusted in the deductive method. One of these concerns the ambiguities which surround the use of the term "temperature". Temperature is not one physical measurement, but two groups of physical measurements, essentially different according as we test equality of temperature by there being no transfer of heat *by conduction* when two bodies are brought into contact, or by radiation when they are made to stand apart. This establishes a division of temperature into two principal groups, and these groups require further subdivision.

The temperature of a body determined in these two different ways may be called its conduction temperature, of each of which there are several varieties. There are accordingly many different kinds of temperature. In the case of gases, conduction, (including convection), is mainly concerned with the translational speeds of the molecules, while radiation in the first instance affects only the internal events going on within the molecules. In most laboratory experiments (carried on as they must be at the bottom of our atmosphere) the partition of energy between the internal events of each molecule and its transitional movements takes place so frequently—probably several times every second in a gas at standard temperature and pressure—that the distinction between the two main kinds of temperature does not need to be attended to. But, to go to the opposite extreme, let us consider the case of a gaseous molecule which has escaped from the earth and travels like an independent planet through space. Here no interchange of energy can take place between the translational movement of the molecule and its internal events. Under suitable external influences either of them may be made to vary to any extent without this affecting the other. The two kinds of energy, or, if we please to call them, of temperatures, have become divorced; and intermediate stages between these extremes would be found to exist within an atmosphere if we could explore it from its bottom to its top.

Further distinctions have to be made within the two principal kinds of temperature. Those which have to be taken into account in the present investigation are the varieties of radiation temperature. A body, like the sun, acting by radiation upon different gases has no one definite radiation temperature, but may be at a different radiation temperature in regard to each gas. Thus, the sun is hotter with regard to the helium of the earth's temperature than with regard to its hydrogen. This we know, because the radiations of the sun which can affect hydrogen come in the form of the rays corresponding to the hydrogen lines of the solar spectrum which are dark, while the radiations which raise the temperature of helium come through rays corresponding to the helium lines, of which the principal one within the visible spectrum—the double line D_3—is as bright as the neighboring part of the spectrum. Hence, the radiation which reaches helium in the outer part of our atmosphere has the full intensity of radiation from the sun's photosphere.

Reviewing the whole case, we find that in the stratum of the earth's atmosphere from which helium escapes, the opportunities of exchanging energy between the internal motions and the translational, instead of occurring to each molecule several times per second, may be so infrequent that they occur only

[6] *See* Maxwell's Scientific papers, vol. 1, p. 380; *or* Philosophical Magazine, January, 1860.

once in several hours. During all its intermediate flights the molecule is exposed during the daytime to the full glare of radiation as intense as direct radiation from the sun's photosphere. In this way the internal motions of the molecule will be kept for some hours excited to intense activity, and if during these hours that special kind of encounter happens to take place which affords an opportunity for an interchange between the internal and translational energies, the two encountering molecules will fling asunder with what may be described as explosive violence. All that is then necessary for a molecule to escape is that one of the two that have encountered shall have the direction of its flight outward, that it shall have sufficient speed, and that it shall escape other encounters. If the chance that these events shall happen befalls each molecule in the penultimate stratum of the helium atmosphere as often as once in several days, there would probably be an abundant outflow of helium from the earth to account for the observed rate of its escape.

Here, however, we are on debatable ground. We can only follow events in detail with probability, not with certainty. But on the other hand, when we trust to the inductive argument based on the ascertained behavior of helium, as stated in an earlier paragraph, *we are on secure ground*. We may rely on the conclusion to which it leads, viz: that helium *is* escaping from the earth's atmosphere, and that the rate of escape is the same as the rate of the net inflow from the earth into the atmosphere. By the net inflow is meant the supply after deducting something like 1/6000 or 1/3000 part of the whole, in order to allow for the very minute quantity of helium that had been washed out of the atmosphere by rain and which is being restored to it.

There are other matters, too, which would need to be understood and allowed for before we should be entitled to trust the deductive method of proof. Thus, the internal events that go on within the molecules of matter are of more than one kind, and in gases stand differently related to the translational motion. This is revealed to us by phosphorescence and other phenomena. An attempt to make a preliminary classification of these internal events has been made by the present writer in a memoir on the kinetic theory of gas.[7] But without going into these and other matters, enough has been said to show how inadequate the deductive method is—at least as hitherto handled—to be a safe guide in dealing with the matters with which it has been made to grapple. This, of course, also shows that objections based on investigations of this character have no weight against the testimony about the rate at which gases do actually escape from atmospheres which is given by such *facts* as the absence of atmosphere from the moon and the behavior of helium upon the earth.

The objection urged by Mr. Cook against accepting the inductive proof of the actual rate of escape of gases from atmospheres is analogous to the objection urged by some scientific men when in 1867 I brought forward a proof[8] that in an atmosphere of mixed gases the atmosphere of each gas must have a different limit, the lighter constituents overlapping and extending beyond those that are denser. "Oh," it was then said "that can't be the case. It is inconsistent with Dalton's law of the equal diffusion of gases". Yet I have lived to see my conclusion generally, I believe universally, accepted by physical astronomers; and I look forward with some hope to an ultimate acquiescence in what is now being objected to in reference to escape of gases from atmospheres. In both cases the objection rests on the same error—the mistake of hypothesis for theory, and the consequent mistake of a law which is approximate for a law of nature.

[7] "Of the kinetic theory of gas as illustrating nature". By G. Johnstone Stoney, F. R. S. Scientific Proceedings of the Royal Dublin Society, June, 1895, vol. 8, p. 356; *or* Philosophical Magazine, October, 1895, p. 362.

[8] "On the physical constitution of the sun and stars". By G. Johnstone Stoney, F. R. S. Proceedings of the Royal Society, No. 105, p. 1, 1898. *See*, especially, paragraphs 23, 24, 25.

THE COORDINATES OF THE UNITED STATES WEATHER BUREAU STATION AT MOUNT WEATHER, VA.

By HERBERT HARVEY KIMBALL, Librarian and Climatologist.

This station is located on the summit of the Blue Ridge Mountains, in Loudoun County, Va. As determined from the Harpers Ferry contour sheet of the United States Geological Survey, its latitude is 39° 4′ north, its longitude 77° 53′ west from Greenwich. The location and surroundings of the station are shown on fig. 1.

No precise leveling has been done in this locality by either of the Government surveys. The Southern Railway has determined grades and elevations on its branch line from Alexandria to Bluemont, Va., the latter point being only about six miles from the Mount Weather station. Unfortunately, the profile constructed from the railway surveys is in two sections. The first extends from Alexandria to Round Hill, Va., the original terminus of the road; the second is the extension from Round Hill to Bluemont. The point of connection between the two sections is not clearly defined, and for this reason doubt was entertained as to the accuracy of the elevation of Bluemont as determined from these profiles.

The nearest Government survey bench mark is at Point of Rocks, Md., about 30 miles from Mount Weather, and the Chief of the Weather Bureau therefore instructed me to run a line of levels from this bench mark to Mount Weather. That part of the survey between Bluemont and Mount Weather was made in August, 1904, the remainder in November following. With the exception of about twelve miles of railroad between Bluemont and Paeonian Springs, Va., most of the route followed the country roads, on which at many points the grade was exceedingly steep.

Starting from the top of the upper end of a railroad culvert just east of the station at Bluemont, the summit of the Blue Ridge was reached by way of Snickers Gap, and the county road near the summit followed to the Mount Weather station. Here the outer corner of the top of the north foundation pier of the water tower was selected as a bench mark.

As a check upon this part of the work, which was the most difficult of all, and also to determine heights in the valley immediately below the Weather Bureau station, the survey was extended down the side of the Blue Ridge to Trapp, Va., and then back to the starting point at Bluemont by way of the Loudoun Valley. The difference in elevation between the culvert at Bluemont and the bench mark at Mount Weather was found to be 1019.903 feet by way of the mountain road and 1019.981 feet by way of Trapp and the valley road, a difference of only 0.078 of a foot. This is considered very satisfactory in view of the fact that on the mountain it was impracticable to make backsights and foresights equal in length on account of the steep grade, the many short turns in the road, and the obstruction of the view by trees.

From the railroad culvert at Bluemont to Paeonian Springs, Va., the survey was along the track of the Southern Railway, and foresights and backsights were made equal in length by counting the ties between stations. At Paeonian Springs we left the railroad and followed the highway to Point of Rocks, Md., by way of Waterford and Taylorstown, Va., crossing the Catoctin Mountains after leaving Taylorstown. The foresights and backsights were kept as nearly equal in length as was possible from eye estimates of distance.

There were few opportunities to check the accuracy of this part of the survey. The exact location of stations occupied by the railroad engineers could be determined in only a few cases. My determination of the height of a nearly level piece of track just west of Hamilton, Va., is 1.4 feet higher than the

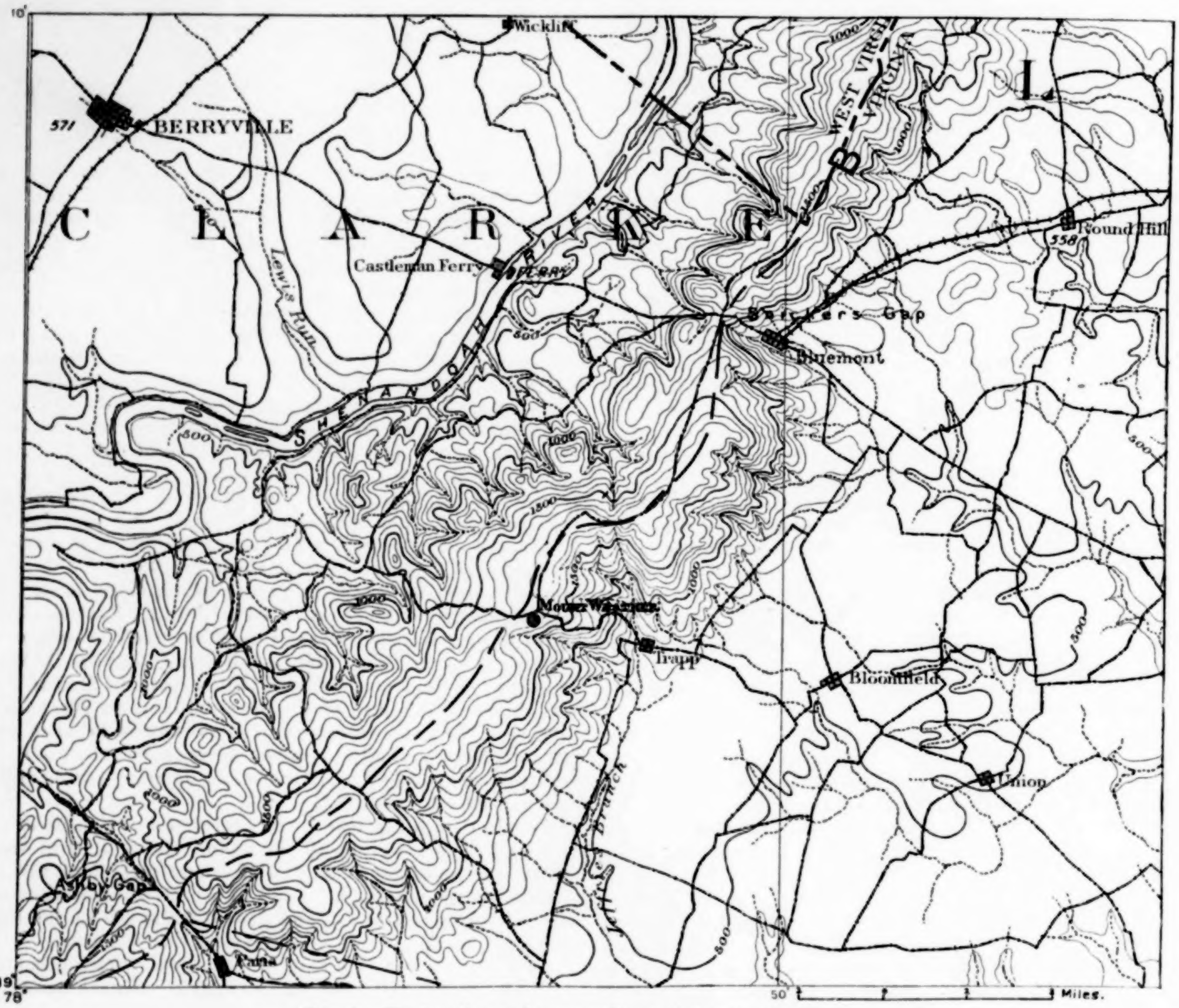

FIG. 1.—The location and surroundings of Mount Weather, Va.

This map is copied from the contour map of the U. S. Geological Survey. By the courtesy of the Southern Railway, the extension of their line from Round Hill to Bluemont is shown. Mount Weather has also been added, and the name of Bluemont substituted for the obsolete name, Snickersville.

railroad figures, and I also found the trestle at Round Hill to be 1.5 feet higher than it is given on the railroad profile. The Weather Bureau survey, therefore, checks with the railroad survey over this six miles of track to within 0.1 of a foot. The Weather Bureau survey shows the rise on the heavy grade just west of the Round Hill trestle to be about eight feet more than is apparently shown on the two railroad profiles. This discrepancy is believed to be due to the fact that the profiles of the two sections of the road do not quite come together. The omission from either profile of a short piece of roadbed at this point, where the grade is very steep, would account for the discrepancy.

A Gurley 20-inch engineer's level was used throughout the work. On the survey between Bluemont and Mount Weather an old direct reading rod was employed, the errors of which have since been determined by the U. S. Bureau of Standards, and the field notes of the survey have been corrected accordingly. For the remainder of the survey a very accurate New York rod was kindly loaned by the U. S. Geological Survey.

As a check on the record, two books of field notes were kept. A reading of the rod was first made and recorded by the rodman, Mr. Bertram J. Sherry; a reading was then made and recorded in a separate book by myself, and the two records were at once compared. Discrepancies of more than 0.001 of a foot were investigated. The two records were separately worked up for the final results, but the discrepancies amounted to only 0.003 of a foot.

Considering the results of all the checks available, and of safeguards employed, it is not believed that the elevations given in the following summary are in error by more than 0.1 cf a foot.

Stations.	Elevation above sea level in feet.	
	U. S. Weather Bureau survey.	Southern Railway survey.
U. S. Geological Survey bench mark B. & O. 44[a], Point of Rocks, Md.	233.323	
Railway track near Hamilton, Va.	458.425	457.0
East end of railway trestle, Round Hill, Va.	546.529	545.0
Top of upper end ot railway culvert, Bluemont, Va.	705.837	696.53(?)
Top of outer corner of north foundation pier to water tower, Mount Weather, Va., by way of mountain road.	1725.740	
The above by way of Trapp	1725.818	
Mean	1725.779	
Barometer cistern below bench mark	0.698	
Height of barometer cistern at Mount Weather, Va.	1725.081	

The little town of Trapp, at the immediate foot of the Blue Ridge on the Loudoun County (east) side, and about one and one-third miles from the Weather Bureau station, is over 1000 feet lower, its elevation above sea level being less than 700 feet. On the west side of the mountain the fall is less abrupt. According to the U. S. Geological Survey contour map the distance from the Mount Weather station to the nearest point on the Shenandoah River is about three miles, and the elevation of the river is between 300 and 400 feet. More exact determinations in the Shenandoah Valley will no doubt be made later.

THE PROPOSED COMPETITION IN FORECASTING AT LIEGE.

[Translation.]

UNIVERSITY OF CLERMONT,
METEOROLOGICAL OBSERVATORY OF PUY DE DOME,
CLERMONT-FERRAND, *January 27, 1905.*

Prof. WILLIS L. MOORE,
Chief U. S. Weather Bureau, Washington, D. C.

SIR: You have been pleased to communicate to me the letter written by you on January 7, last, to Mr. Jacobs, president of the Belgian Astronomical Society[1], in reply to the letter in which he invited you to become a member of an international jury charged with judging in a competition in weather forecasting which the Belgian Astronomical Society proposes to organize.

In accordance with your desire, I hasten to give on the subject the views which you do me the honor to request.

First of all, I had nothing to do with the editing of the document, or rather the proposed document, which was sent to us, and in forwarding my acceptance to Mr. Jacobs I made some express reservations and indicated especially that, in my opinion, the jury, when definitely constituted, should alone be qualified to decide upon the programme. I even made my acceptance conditional upon that of Mr. Teisserenc de Bort; convinced as I was in advance that if that eminent scientist consented to make one of the jury, his influence would be sufficient to have erased from the proposed programme whatever might be unscientific and give rise to well founded opposition.

I had not been consulted either as to my possible participation in the jury, and I should not have failed to protest—as you have done—if they had given my name as a member of the jury in a printed document destined to be given to the public; but I understood that it was only a proposed programme, and that in making use of my name in a printed proof I was left perfectly free to accept or to decline the invitation, and it was the same with all the others whose names appeared with mine.

Having given these preliminary explanations, it is very easy for me to tell you how heartily I am in accord with you as to the injury that is done to science by these fantastic prophets who, without any knowledge of the general movements of the atmosphere, forecast the coming weather somewhat after the manner of those who tell fortunes with cards, and whose blunders do not succeed in exhausting the credulity of the the public. It is necessary at any cost to prevent these from taking any part in a serious competition; and it was, in my opinion, very unfortunate that to the provision for a competition in forecasting for a proximate period they should have added a provision for forecasts several weeks in advance. It is evident that in the present state of science no such prediction can be made scientifically. My intention was to ask, in conjunction with Mr. Teisserenc de Bort, with whose ideas on these subjects I am well acquainted, the absolute elimination of this part of the programme, or rather this "side issue" added to the programme. I thought, however, that this side of the question could be more advantageously discussed when the jury had been constituted.

Again, I entirely agree with your view and those of Mr. Pernter when you say that it would be impossible to accept results, even if they should be excellent in themselves and verified by experience later, without knowing the methods by which they have been obtained; and I am firmly convinced that no prize should be adjudged to a metorologist for forecasts for very short periods in advance, unless he explains the details of his methods in such a way that afterwards any one else may be able to make use of it just as well as he.

The point upon which I take the liberty of differing with you, however, is in regard to the utility of a practical test by the author himself of a method of short-range forecasting. This question was discussed at the thirty-second meeting of the French Association for the Advancement of Science, held at Angers in 1903; the seventh section (Meteorology and Physics of the Globe), of which I had the honor to be president, formulated the following resolution:

> "The seventh section, impressed by apparently proper methods for increasing the accuracy of weather predictions for short periods in advance, expresses the wish that the administration may give to the authors every facility for applying their methods under the most favorable conditions, and by appropriate tests, such as a competition, should allow competent scientists to pronounce as to the efficacy of these methods."

This resolution was adopted unanimously.

I can not but think that, in the present state of science, the prediction for the immediate future of depressions and centers of high pressure over Europe might be made with more precision than is ordinarily the case. Without entering into personal details, I may say that at this Congress of Angers the Section of Meteorology of the French Association was deeply impressed with the accuracy of certain forecasts applied to past conditions, and the French Association for the Advancement of Science, without itself taking the initiative for a competition, was won over to the idea that if those who think they can improve the methods of forecasting were put to the test and forced to apply their methods to a real prediction it would furnish the means of distinguishing that which is real progress from that which is only a repetition of what has been already done.

We do not lack persons who have general and very rational rules for predictions—to which indeed no objection can be made—but who, when charged with applying these rules, do not succeed in producing anything more than indications that are too vague to be of any real use. If those who think they can do better agree to submit to a severe test, and to explain afterwards their method of procedure, so that, by following them, others can derive profit from it, I can see in this only an excellent opportunity to separate what is serious and worthy to be called scientific from what is not. We must only take precautions. It will be especially necessary to abandon all idea of long-range forecasts, and carefully avoid anything that can furnish grounds for the criticisms—often so well founded—formulated by yourself and Mr. Pernter; but I think that the competition in itself, particularly if scientists of the standing of Mr. Teisserenc de Bort watch over it and exercise a control over its acts, would give rise to an exchange of ideas and discussions that would conduce to progress.

Believe me, dear sir, that this difference of opinion as to the utility of a *competition for forecasts for very short periods* does not prevent me from recognizing the correctness of your remarks, and I beg you to accept the assurance of my highest regard.

(Signed) BERNARD BRUNHES,
Director of the Observatory.

[1] *See* Monthly Weather Review, November, 1904, p. 523.

SOLAR HALO OF FEBRUARY 3, 1905, AT WASHINGTON, D. C.

By ERIC REX MILLER, Weather Bureau.

A solar halo observed at Washington, D. C., on February 3, 1905, deserves mention on account of its permanence and brilliant coloration; and especially because it was accompanied

by mock suns or parhelia, a phenomenon very infrequently observed at Washington.

The halo was of the usual 22° radius. No other circles were certainly made out, though some who observed it describe a "concentric" circle about 4° or 5° outside the halo which may have been an indistinct contact arch. The halo was very highly colored in the part nearest the zenith, but faded to white at its lower portion, where the intensity was much diminished by smoke and haze near the horizon.

The parhelia were situated at the east and west sides of the halo and had about the same altitude as the sun. They were about 4° outside the halo, and not, as they are usually described and drawn, on its circumference. The parhelia exhibited the prismatic colors, red predominating, but no tail or prolongation was observed on either parhelion.

The phenomenon was first seen shortly after noon, but must have been visible for some time before, as it had then attained its greatest intensity. It continued, diminishing gradually in distinctness, until about 3 p. m. when it disappeared on account of increasing thickness in the cloud to which the phenomenon was due.

The appearance of the mock suns outside the halo excited comment, since they are generally described and shown in diagrams as situated on the halo. The theory of the departure of the parhelia from the halo is briefly stated by Loomis, "Meteorology" p. 221, and is given in full by Mascart, "Traite D'Optique," tome 3, p. 486, et seq. In this connection it may be worth while to summarize some of the principal facts in regard to halo phenomena, particularly the halo of 22°.

The halos and other circles are formed by refraction or reflection of sunlight or moonlight by ice crystals floating in the air, or by a combination of refraction and reflection.

Ice crystals, which belong to the hexagonal system of crystalization, refract light in various ways, depending upon the direction of the incident ray with reference to the crystal. The least possible deviation occurs when the ray is in the principal plane of the prism, i. e., perpendicular to its longitudinal axis, and passes through two faces inclined to each other at an angle of 60°, making equal angles with these faces at incidence and emergence. Under these conditions the direction of red light, the least refrangible color, is deviated an angle of 21° 37′ by the ice prism, while violet, the most refrangible color, is deviated 22° 22′.

When the sky is covered with upper clouds composed of ice particles these crystals may, if the air is in a state of agitation, be supposed to be oriented in every possible way with respect to the light from the sun. At a given point, an observer will receive refracted light from all parts of the cloud except from within a circle of 21° 37′ radius surrounding the sun, refracted light from prisms within this circle falling short of the observer. In consequence, the illumination of the sky is increased except within the circular space around the sun.

Sunlight is decomposed by refraction into the colors of the spectrum. In the case under consideration, all the colors will be received from each point of the sky, except within the circle of the halo, on account of the different positions of the ice crystals in the cloud at each point. Except where some particular color is omitted or reinforced the different colors will be superposed in such a manner as to produce white light. Such omission of color occurs at the edge of the unilluminated circle around the sun, the violet light disappearing at 22° 22′ from the sun, followed by the less refrangible colors in succession until at 21° 37′ the red disappears. It is in this manner that the color of the halo is produced.

Bearing in mind the position of a prism necessary to produce minimum deviation, it will readily be seen that the halo is produced by crystals lying in planes perpendicular to a line joining the observer and the sun, the longitudinal axis of each crystal being tangent to the circle of the halo. Necessarily, then, none of these crystals will be vertical except when the sun is at or near the horizon, and even then only those crystals on the sides of the halo at the same altitude as the sun will be vertical.

When the air is tranquil the ice crystals tend to assume that position in which they experience the least resistance in falling through the air. The lateral faces of the acicular crystals and the bases of the lamellar crystals become vertical. When the number of vertical crystals preponderates light reflected from these surfaces produces a white horizontal circle at the same angular altitude as the sun. This is the parhelic circle. The brightness of this circle is further augmented by the light refracted by these crystals, and colors are shown at the points of minimum deviation of the refracted light for the reason that the angle of minimum deviation is different for the different colors, and some being omitted allow the less refrangible to predominate. The mock suns or parhelia are produced in this way.

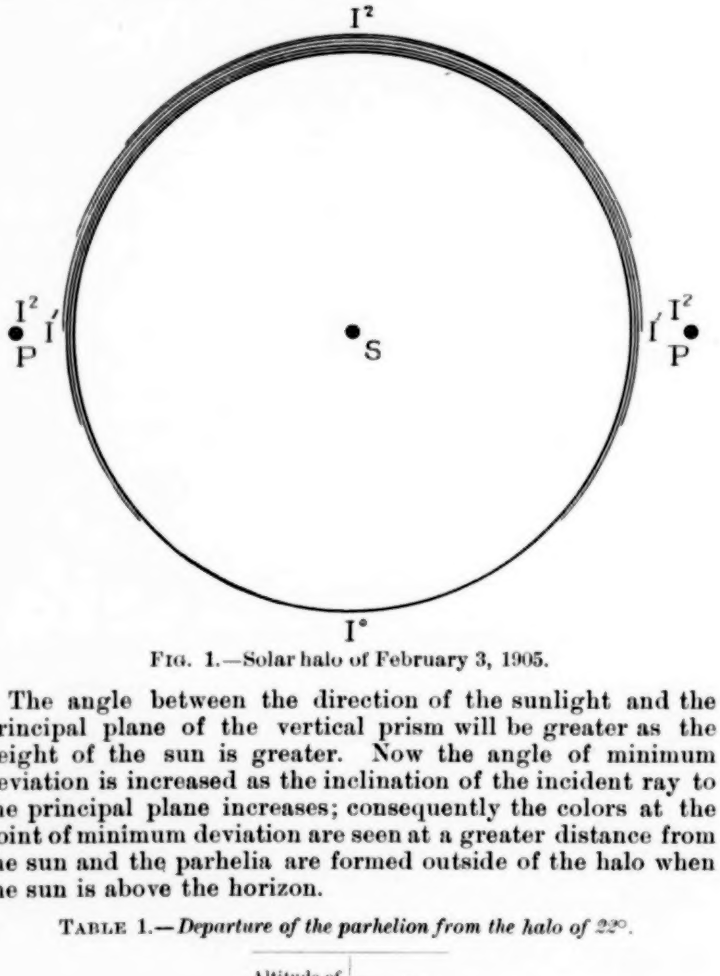

FIG. 1.—Solar halo of February 3, 1905.

The angle between the direction of the sunlight and the principal plane of the vertical prism will be greater as the height of the sun is greater. Now the angle of minimum deviation is increased as the inclination of the incident ray to the principal plane increases; consequently the colors at the point of minimum deviation are seen at a greater distance from the sun and the parhelia are formed outside of the halo when the sun is above the horizon.

TABLE 1.—*Departure of the parhelion from the halo of 22°.*

Altitude of the sun.	Departure.
° ′	° ′
0 00	0 00
10 00	0 18
20 00	1 14
30 00	2 58
40 00	5 48
50 00	10 37
60 00	22 47
60 45	28 14

Table 1, from Mascart, shows the departure of the parhelion from the halo for different altitudes of the sun. It will be noticed that up to about 30° this departure is approximately proportional to the square of the sun's altitude, but increases more rapidly for higher altitudes. When the sun

is more than 60° 45′ above the horizon the parhelia accompanying the halo of 22° are no longer formed.

In addition to the works previously mentioned valuable articles on halo phenomena will be found in the MONTHLY WEATHER REVIEW for 1897 on pages 294 and 305, and in the volume for 1902, page 317.

METEOROLOGICAL CHARTS OF THE INDIAN OCEAN.

By CHARLES FITZHUGH TALMAN, Section of Ocean Meteorology, U. S. Weather Bureau.

As one result of the recent transfer of the work in ocean meteorology from the Hydographic Office to the U. S. Weather Bureau, the latter becomes a cooperator in the important studies of the Indian Ocean and adjacent lands, recently undertaken on a large scale by the meteorological service of India. The general plan of this work was outlined by Sir John Eliot, in his notable address before the subsection of Cosmical Physics at the last meeting of the British Association.

The Indian Service published for several years daily synoptic charts of the Indian monsoon area, but the region covered by these charts extended only between 36° north and 12° south latitude. The observations upon which the charts were based were partly made at the shore stations, and partly obtained from meteorological logs of vessels. In view of the vast importance to India of a complete understanding of the conditions which control the monsoon winds and the resultant rainfall, it has been decided to extend the field of observation over the greater part of the Southern Indian Ocean, and also to include broad areas of the surrounding continents and islands.

In order to obtain as many observations as possible from the oceanic areas, and especially from the region of permanent high pressure in the ocean east of Cape Colony, the cooperation of the British, German, and American meteorological services has been requested. These three services are now engaged in securing marine observations from vessels of all nationalities throughout the world. As an indication of the probable number of reports to be furnished by the Weather Bureau, the statement of the Hydrographic Office as to the number of reports of trans-Indian voyages received during the period January 1, 1902, to January 1, 1904, is of interest. The number was 53, and the average time spent within the prescribed area was 51 days, making a total of 2700 observations in 720 days, or approximately four observations a day. To this number, the vessels reporting to the British and German meteorological services, together with those which report direct to the Indian Service, will be added, making up a very respectable total; so that the daily synoptic charts which the Indian Service is to prepare, commencing with January 1, 1905, are likely to present an interesting and valuable picture of the march of weather conditions over this region.

Sir John Eliot says:

> It has been found that the abnormal conditions of the past seven years, with their droughts in Australia, Africa, and India, have been associated with abnormal pressure conditions over a very large portion of the earth's surface; and it is hoped that these charts will enable light to be thrown on a number of questions of scientific interest as well as of economic importance.

The new enterprise of the Indian Meteorological Service appears to be an important step in the direction of "world meteorology," with successful long-range forecasting as its ultimate aim.

EARTHQUAKES OF JANUARY AND FEBRUARY, 1905.

BY PROF. CHARLES F. MARVIN.

The following notes have reference to two slight earthquakes recorded by the Bosch Omori seismograph at the Weather Bureau in January and February of 1905.

The first, while definitely registered was of short duration and only a few of the characteristic features of such records were well developed. The second was a much stronger disturbance.

The detailed times of the usual features follow:

Earthquakes of January and February, 1905, seventy-fifth meridian time.

	January 20, 1905, (p. m.)			February 14, 1905, (a. m.)		
	h.	*m.*	*s.*	*h.*	*m.*	*s.*
First preliminary tremors began	1	6	37	4	14	10
Second preliminary tremors began	1	10	58	4	23	00
Principal portion began	1	14	38	4	31	21
Principal portion ended	1	20	32	4	35	36
End of earthquake	1	29	15	5	20	00

	January 20, 1905	February 14, 1905
Duration of first preliminary tremors	4 min. 21 sec.	8 min. 50 sec.
Duration of second preliminary tremors	3 " 40 "	8 " 21 "
Duration of principal portion	5 " 54 "	4 " 15 "
Total duration of earthquake	23 " 38 "	1 hr. 5 " 50 "

Average period of definite waves, in preliminary portion	19.8 sec.
Average period of definite waves in principal portion	17.0 "
Period of pendulum	28.0 "
Maximum double amplitude of actual displacement of earth at seismograph	0.22 mm.
Magnification of record	10 times.

The earthquake of February 14 was preceded and followed by very perceptible pulsatory oscillations, by which are meant very slight oscillations that are visible throughout nearly the entire record and which have been noticed to occur from time to time without apparent close connection with other observed phenomena. These oscillations tend to render the determination of the times of beginning and ending of the feebler phases of the earthquake inexact.

DR. J. O. HARRIS.

By WILLIAM G. BURNS, Section Director, U. S. Weather Bureau.

Dr. J. O. Harris, an honored member of the staff of voluntary observers of the Climate and Crop Service of the Illinois Section, died at his home in Ottawa on the morning of January 10, aged 77 years. He was born at Liverpool, Onondaga County, New York, on September 13, 1828. He was a descendant of Revolutionary stock. A graduate in medicine, he entered the Army in 1862 as assistant surgeon of the 53d Illinois infantry. He was public-spirited and identified with every local enterprise. A man of high literary and scientific attainments, as early as 1854 he organized the public library, and his labors in the meteorological field date back to 1853, when he acted as correspondent for the Smithsonian Institution.

Since the organization of the Signal Service in 1870, Doctor Harris has served as voluntary observer, and his labors ceased only with his death.

RECENT PAPERS BEARING ON METEOROLOGY.

Mr. H. H. KIMBALL, Librarian and Climatologist.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

Nature. London. Vol. 71.

Robinson, Edward E. Super-cooled raindrops. P. 295.

—— Floods in the United States. P. 308.

MacDowall, Alex. B. The moon and the barometer. P. 320.

Knowledge. London. New Series. Vol. 2.

Clarke, Agnes M. Modern cosmogonies. XII. Our own system. Pp. 24-26.

—— The late Rev. J. M. Bacon. P. 31.

Lockyer, William J. S. Our sun and "weather." Pp. 33-35.

Proceedings of the Royal Society. London. Vol. 74.
Chree, Charles. An analysis of the results from the Falmouth magnetograms on "quiet" days during the twelve years 1891 to 1902. Pp. 323-326.
Journal of Geography. London. Vol. 25.
—— A scheme for the comparison of climates. [Review of work of W. F. Tyler.] P. 217.
Science Abstracts. London. Vol. 8.
B[orns], H. Direct and photographic observations of auroras. [Abstract of paper of Sykora.] P. 5.
Ros[enhain], H. Further comparisons of gas thermometers. P. 35.
S[tarling], S G. Electric conductivity of air and quantity of ozone present. [Abstract of work of V. Conrad and M. Topolansky.] P. 43.
B[orns], H. Diurnal variation of the magnetic elements in Batavia, and sun spots. [Abstract of work of J. Liznar.] P. 54.
Aëronautical Journal. London. Vol. 9.
Baden-Powell, B. The aëronautical competition at the St. Louis exhibition. Pp. 2-4.
Dines, W. H. On kites, kiteflying, and aëroplanes. Pp. 4-7.
Hergesell, M. H. The work of the International Commission for Scientific Aëronautics. Pp. 7-13.
Science. New York. Vol. 21.
Clough, H. W. Synchronous variations in solar and meteorological phenomena. [Abstract of paper of H. W. Clough.] Pp. 174-175.
Fox, Philip. Determination of the solar rotation period from flocculi positions. [Abstract of paper of Philip Fox.] P. 175.
Barus, Carl. Note on the variation of the sizes of nuclei with the intensity of the ionization. Pp. 275-276.
Scientific American. New York. Vol. 92.
—— New radium theories. P. 102.
—— What we know about sun spots. P. 147.
Scientific American Supplement. New York. Vol. 59.
—— On the genesis of radio-activity. P. 24307.
Pernter, J. M. Methods of forecasting the weather. Pp. 24358-24360.
—— The molecule, the atom, and the new theory of matter. Pp. 24388-24339.
Journal of Geography. New York. Vol. 4.
Wilcox, Glenn A. A summer shower in Arizona. Pp. 40-41.
Wilcox, Glenn A. An exercise on weather maps. Pp. 41-42.
Popular Science Monthly. New York. Vol. 66.
Campbell, W. W. An address on astrophysics. Ppr 297-318.
School Science and Mathematics. Chicago. Vol. 5.
Abbe, Cleveland. The introduction of meteorology into the courses of instruction in mathematics and physics. Pp. 3-14.
Cox, Henry J. Recent advances in meteorology. Pp. 89-93.
Le Temps qu'il Fait. Mons. 2me année.
—— Marconigrammes du temps. Pp. 25-27.
V., C. D. L'atmosphère et sa transparence. Pp. 32-36.
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RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

By Mr. H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

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NOTES AND EXTRACTS.

APPARATUS FOR INSTRUCTION IN PHYSICS AND METEOROLOGY.

The editor has so often been asked what apparatus to buy or how best to expend a given amount of money for furnishing a school laboratory, that he would venture a few general remarks on this subject.

In manual training schools, technical schools, colleges, and post graduate or university research schools, wherever the primary object is to teach and practise the greatest exactness of construction, observation, and investigation; there, of course, nothing but the best should be allowed. These schools are conducted by teachers who understand exactness; it is mostly the public grade schools or high schools that apply for advice as to apparatus for elementary educational purposes.

For high schools and lower grades, the object of whose instruction is to teach general principles and the elements of physics, expensive accurate measuring apparatus is not required. The scholar will learn general laws and principles better by making a rough instrument himself than by merely looking at a highly finished one.

When a teacher desires to maintain a daily weather record as a voluntary observer, he must be provided with the standard apparatus of the Weather Bureau. No cheaper makeshift will do. He need not buy a complete outfit, but what he has must be standard. But when such a record is kept only for local educational purposes as the beginning of a system of training for young pupils, expensive apparatus is objectionable, and the simplest (not always the cheapest) apparatus is most desirable, so that a youth may handle it and easily see how it works and what its source of error may be. For such cases the mercurial thermometer divided on its glass stem, the sling psychrometer, the wind-pressure anemometer, using a pendulous sphere or a square plate, or a Lind anemometer, a homemade syphon mercurial barometer, a Campbell sunshine recorder with a burning glass as a substitute for the expensive sphere, these among others offer the desired simplicity, while sufficient to record the atmospheric phenomena abundantly for educational purposes.

It seems very inadvisable to introduce into elementary schools expensive instruments that are used for exact scientific work or exemplify the best methods of science, such as a Green-Fortin barometer, or the Robinson whirling anemometer, whose structures are complex and whose actions and corrections depend on a theory that can not be demonstrated by simple reasoning adapted to the elementary knowledge of the pupil. Let a youth learn about the more complex and precise physical apparatus after he passes on to the college and higher technical schools. He will then come to understand the sources of error of the so-called "popular" instruments, and understand the lingo of the salesman of "school supplies" who recommends the wooden support of his barometer scale as making an absolutely constant and correct instrument, or his thermometer as equal to those of the Weather Bureau. The best part of education is to teach a man where to go for reliable information on matters that he has not himself thoroughly studied, and how to protect himself against imposition of all kinds.—*C. A.*

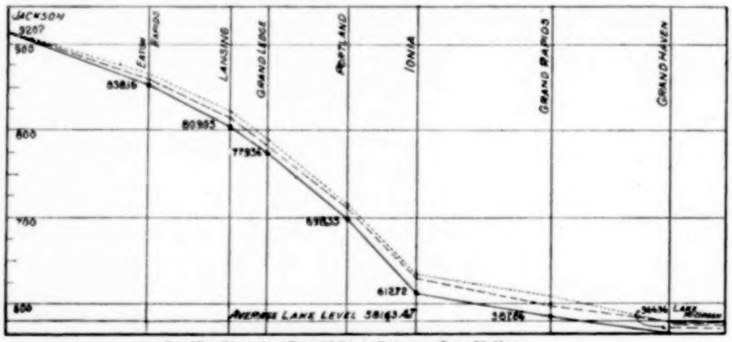
A RIVER AND FLOOD SERVICE ON THE GRAND RIVER OF MICHIGAN.

In view of the recent extension of the River and Flood Service of the Weather Bureau in various parts of the country, we may perhaps call attention to certain minor advantages incidental to this work, whose main purpose is the protection of lives and property threatened by high water. The careful study of the rivers by this service, and the systematic observations carried out at river stations yield information of high value in connection with questions of water power, water supply, irrigation, and other hydrographic problems, and on the larger streams are of the utmost importance in connection with navigation and the work of river improvement. Something on these points is suggested by the following statements:[1]

[1] From the December report of the Michigan Section of the Climate and Crop Service of the Weather Bureau, by C. F. Schneider, Section Director at Grand Rapids, Mich.

In view of the destructive floods along the Grand River of Michigan in March, 1904, the Chief of the Weather Bureau has inaugurated a river and flood service on that river; with the Grand Rapids Weather Bureau Office as the river center. River gages have been located at Eaton Rapids, Lansing, Grand Ledge, Portland, Ionia, and Grand Rapids, and readings will be made daily during February, March, and April, and at any other season when necessary. These stations are also equipped with rain gages, and in connection with a special rainfall station at Jackson will furnish the data regarding the height of the river and amount of precipitation.

The Weather Bureau made a careful survey of the river in order to determine the height of the river bed at the various gage stations. In all cases the zero of the gage is the same as the bed of the river, and the danger line was determined by consultation with the principal manufacturing interests. From marks preserved by various citizens the elevation of the high water of March, 1904, was also determined. Much of this data is entirely new and very interesting. The rapid fall of the river between Grand Ledge and Ionia is a feature that has never before been definitely determined, and the great possibilities of that particular section for water power are clearly shown. The drainage area of the Grand River, 5572 square miles, is the second largest in the State.



Profile Showing Fall Of River Between Gage Stations

High Water Danger Line — — — —

High Water Mar. 26-27 1904 ···········

FIG. 1.

The floods of the last decade of March, to which Mr. Schneider refers, were caused by rains that melted the accumulated snow of almost the entire winter while the ground was frozen and unable to absorb any of the water thus suddenly formed. At Grand Rapids about 14,000 persons were rendered temporarily homeless, and the total damage by the flood in that city alone is estimated at $2,000,000.—*F. O. S.*

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. William G. Burns, Section Director, Springfield, Ill., on January 25 addressed the class in physical geography from the Springfield High School, at the office of the Weather Bureau. Mr. Burns described the work of the Weather Bureau and explained the principles of forcasting, the construction of the weather map, and the use of meteorological instruments.

Mr. David Cuthbertson, Local Forecaster, Buffalo, N. Y., states that students from two of the local high schools, and also from the Lancaster, N. Y., High School, visited the office during January and received instruction in elementary meteorology, with an explanation of the instruments and work of the Weather Bureau.

Mr. G. A. Loveland, Section Director, Lincoln, Nebr., delivered two addresses before the Farmers' Institute; on January 5, at Johnson, Nebr., on "Weather Forecasts, how Made, Distributed, and Used," and on January 31, at Fairbury, Nebr., on "The Climate of Nebraska."

Mr. George T. Todd, Observer, Wichita, Kans., on January 19 addressed the preparatory class of Fairmount College. The

instruction consisted of an explanation of the instruments, weather maps and charts, with some remarks on weather forecasting, and the value of the Weather Bureau's records.

Mr. C. F. von Herrmann, Section Director, Raleigh, N. C., on January 16 began his second year as instructor in meteorology at the Agricultural and Mechanical College at West Raleigh. He has prepared a course of twelve lectures, to be delivered before the senior class in agriculture, comprising:

1. The atmosphere; its origin, evolution, and arrangement.
2. The physical properties of the atmosphere; sources of heat.
3 and 4. The temperature of the atmosphere.
5. The pressure of the air.
6. Moisture, and its condensation into cloud, etc.
7. The various forms of precipitation.
8. Winds.
9. General circulation of the atmosphere.
10. Cyclones and anticyclones.
11. Weather and local storms.
12. The work of the Weather Bureau.

Mr. Edward L. Wells, Observer, Boise, Idaho, was visited on January 18 by the class in physical geography of the Boise High School, and on January 21 by a number of pupils from one of the public schools. Instruction was given on both occasions in the use of instruments, methods of forecasting, with some reference to long-range forcasting, collecting data, and disseminating information.—*F. O. S.*

METHODS OF MEASURING DURATION OF RAINFALL.

Mr. T. Okada[1] has applied to Japanese records the formula proposed some years ago by Prof. Dr. W. Köppen[2] for determining the absolute duration of precipitation from observations at regular intervals. Let n be the total number of observations, and r the number of observations with precipitation. Then r/n is the absolute probability of precipitation, and if N be the total number of hours in a month, then $(r/n)\ N$ is the probable duration of rainfall in hours during the month.

A comparison of the duration calculated by this method from hourly observations with the duration recorded by a very sensitive pluviograph from 1899-1903 shows a mean difference in the total annual duration of 6 per cent, with an extreme difference of 12 per cent. If monthly values are considered, the difference will average 11 per cent of the calculated amount, with an extreme difference of 25 per cent, the extremes occurring always in the colder months, when the duration is least. As a rule the calculated duration exceeds the recorded duration, although in the warmer months the reverse is not infrequently the case. This, in Mr. Okada's opinion, may be explained by the failure of the pluviograph to record the very light snows of winter, and its tendency, owing to the sluggishness of the rain gage, to exaggerate the duration of the light showers of summer. The pluviograph used is a modified form of Rung's weighing gage.[3]

In order to compare the results computed from hourly observations with those from six-daily and tridaily observations, records were taken for the ten years ending in 1902 from the following eight stations, distributed in various parts of the empire differing greatly in climatic conditions.

Stations.	Latitude.		Longitude.		Altitude.	Mean number of days with rain.
	°	'	°	'	*Meters.*	
Kumamoto	32	48	130	42	17	156
Matsuyama	33	50	132	45	32	141
Osaka	34	52	135	31	6	113
Hiroshima	34	23	132	27	3	129
Nagoya	35	10	136	55	15	140
Tokio	35	41	139	45	21	142
Hakodate	41	46	140	44	3	178
Sapporo	43	4	141	21	17	188

[1] Journal of the Meteorological Society of Japan, November, 1904, p. 9.
[2] Zeitschrift Oesterreichischen Gesellschaft für Meteorologie, Band 15, 1880, p. 362.
[3] Meteorologische Zeitschrift, 1884, vol. 1, p. 461.

TABLE 1.—*Mean monthly and annual duration of precipitation, in hours, for the period 1892-1901, computed by Köppen's formula from hourly, six-daily, and tridaily observations.*

Months.	Hourly observations.	6-daily observations.	3-daily observations.	Difference. 6-daily minus hourly.	Difference. 3-daily minus hourly.
KUMAMOTO.					
January	82.9	75.1	87.8	− 7.8	+ 4.9
February	87.3	88.7	92.7	+ 1.4	+ 5.4
March	125.0	126.5	125.7	+ 1.5	+ 0.7
April	130.3	122.4	136.8	− 7.9	+ 6.5
May	121.5	122.8	119.0	+ 1.3	− 2.5
June	127.3	126.0	126.7	− 1.3	− 0.6
July	102.3	107.9	117.6	+ 5.6	+15.3
August	49.1	46.9	49.8	− 2.2	+ 0.7
September	94.0	87.8	83.6	− 6.2	− 5.4
October	78.8	81.1	77.4	+ 2.3	− 1.4
November	59.4	61.9	61.9	+ 2.5	+ 2.5
December	64.1	62.5	67.0	− 1.6	+ 2.9
Year	1122.0	1110.6	1151.0	−11.4	+29.0
OSAKA.					
January	63.3	62.5	59.5	+10.3	+ 7.3
February	58.8	63.6	62.9	+ 4.8	+ 4.1
March	100.2	101.2	98.2	+ 1.0	− 2.0
April	116.1	115.9	115.2	+20.7	+20.2
May	102.0	100.5	100.4	− 1.6	− 1.6
June	112.6	110.2	108.0	− 2.4	− 4.6
July	85.5	90.8	84.8	+ 5.3	− 0.7
August	38.8	37.2	36.5	− 1.6	− 2.3
September	110.1	109.4	92.9	− 0.7	−17.2
October	92.8	95.2	96.0	+ 2.4	+ 3.2
November	66.3	66.2	44.6	− 0.1	−21.7
December	47.0	46.8	46.1	− 0.2	− 0.9
Year	961.5	999.4	945.1	+ 3.7	−16.4
TOKIO.					
January	69.6	69.9	75.9	+ 0.3	+ 6.3
February	68.4	69.0	67.7	+ 0.6	− 0.7
March	127.3	124.2	124.2	− 3.1	− 3.1
April	137.7	137.5	141.1	+ 0.2	+ 3.4
May	131.1	128.0	130.9	− 3.1	− 0.2
June	135.2	138.2	138.2	+ 3.0	+ 3.0
July	114.8	116.1	110.8	+ 1.3	− 4.0
August	66.0	66.2	73.7	+ 0.2	+ 7.7
September	151.4	154.1	156.8	+ 2.7	+ 5.6
October	133.0	134.7	137.6	+ 1.7	+ 4.6
November	78.0	78.5	81.4	+ 0.5	+ 3.4
December	47.2	46.9	41.7	− 0.3	− 5.5
Year	1259.5	1263.3	1280.2	+ 3.8	+20.7
SAPPORO.					
January	226.3	225.4	232.9	− 0.9	+ 6.6
February	188.7	183.4	184.8	− 5.3	− 3.9
March	200.4	202.4	215.8	+ 2.0	+15.4
April	106.1	108.7	105.8	+ 2.6	− 0.3
May	111.8	112.3	116.1	+ 0.5	+ 4.3
June	101.1	98.6	97.9	− 2.5	− 3.2
July	101.2	99.7	103.4	− 1.5	+ 2.2
August	101.4	101.1	110.1	− 0.3	+ 8.7
September	118.7	116.6	121.7	− 3.1	+ 2.0
October	116.4	113.8	118.3	− 2.6	+ 1.9
November	159.7	157.7	165.6	− 2.0	+ 5.9
December	212.6	209.0	223.2	− 3.6	+10.6
Year	1745.4	1728.7	1795.6	−16.7	+50.2

The results for these eight stations, four of which are given in Table 1, show that the durations computed from tridaily and from hourly observations do not differ by more than 4 per cent in the annual means or 18 per cent in the monthly means, while a comparison of the hourly with the six-daily observations shows a still closer agreement. Comparing these figures with the results obtained from his self-recording rain gage, and assuming that the differences in the latter case are due chiefly to instrumental errors, Mr. Okada concludes that the duration of precipitation may be computed from tridaily observations more accurately than it is recorded by the gage. His comparison, however, is inexact, since it is based in one case upon 10-year means and in the other case upon either 4-year means or individual months and years. This method of computation may give approximate mean values, but probably within larger

TABLE 2.—*Differences, in hours, of the mean durations of precipitation, for the period 1892-1901, as computed by Köppen's formula from hourly, six-daily and tridaily observations.*

Stations.	Mean of the monthly differences.		Greatest difference.		Least difference.	
	6-daily minus hourly.	3-daily minus hourly.	6-daily minus hourly.	3-daily minus hourly.	6-daily minus hourly.	3-daily minus hourly
Kumamoto	3.5	6.5	− 7.9	−15.3	± 1.3	− 0.6
Osaka	4.3	7.2	+20.7	−21.7	− 0.1	− 0.7
Tokio	1.4	4.0	− 3.1	+ 7.7	+ 0.2	− 0.2
Sapporo	2.3	5.4	− 5.3	+15.4	− 0.3	− 0.3

limits of error than those given above. An examination of the columns of differences in Table 1[4] will show that abnormally large and abnormally small differences often occur in the same month.

The self-registering rain gages in use by the Weather Bureau, although they may not show the true time of beginning and ending of precipitation, give with considerable accuracy the duration between the first and last recorded hundredths of an inch, and this information is for most purposes of more value than a record of total duration that does not distinguish the period of inappreciable precipitation.—*F. O. S.*

[4] The reader may observe one or two discrepancies in this table. These are doubtless due to misprints in the original.

A RECORD BROKEN AT THOMPSON HILL, CONN.

Miss Ellen D. Larned, at Thompson Hill, Windham County, Conn., keeps a record of the weather extending back over the unusual period of fifty-three years. In a recent letter she writes that the year 1904 has lowered her previous minimum by nearly one degree.

	°
Previous lowest mean annual temperature, (1888)	44.8
Mean annual temperature for 1904	43.9
Mean annual temperature, 1852-1901	46.0
Warmest year, 1878	49.1
Coldest year, 1904	43.9

Miss Larned also notes that with the exception of May, 1904, each month since May, 1903, has been below the normal, a sequence without parallel in either her own record or any other that she has been able to examine. As the deficit was very small in some of the months it may not have occurred at other stations.—*F. O. S.*

THE WEATHER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and VI.

The mean pressure for the month was unusually high over the northern and middle Plateau, the slope, Missouri and Mississppi valleys, and Gulf districts, with the crest 30.40 to 30.43 inches overlying northern and central South Dakota, North Dakota, and northeastern Montana.

The lowest mean pressure reported was 30.01 inches at Eastport, Me.

The pressure was everywhere above the normal for the month, except over the extreme southwestern portion and the northern portion of California, southwestern Oregon, and western Nevada. The greatest negative departure was —.04 inch at Eureka, while departures ranging from +.20 to +.30 inch were reported from stations in the Missouri Valley, Oklahoma, the middle and northern slope regions, and North Dakota, the greatest departures occurring in the Dakotas.

The mean pressure increased over that of December in all districts, except in southern Oregon, western Nevada, and the northern and central portions of California.

Over the region from Montana, North Dakota, and Minnesota, southeastward and southward to the Gulf coast of eastern Texas, Louisiana, Mississippi, and western Florida, the departures were very marked, and ranged from +.35 inch at stations in eastern Montana, and North Dakota to from +.11 to +.13 inch on the Gulf coast. The greatest decreases in pressure ranged from —.05 to —.08 inch over western Nevada and northern and central California.

TEMPERATURE OF THE AIR.

The mean temperature for the month was above the normal in the Pacific and Plateau districts, the northern slope, and western portions of the middle and southern slope regions, and the Valley of the Red River of the North. In the remaining districts the mean temperature was below the normal.

Over the greater portion of the Pacific and Plateau regions the departures from the normal ranged from +2.0° to +7.4°, the maximum departures occurring over northeastern Washington, Idaho, and northern Nevada.

From the slope regions eastward to the Atlantic Ocean the departures were very marked and ranged from —2.0° to —8.7°, the greatest departures, more than —6.0°, being reported from the central and lower Ohio Valley, Tennessee, the central and northern portions of the east Gulf States, eastern Arkansas, Oklahoma, southeastern Kansas, southern and central Missouri, and southern Illinois. The maximum departure occurred in east-central Kentucky.

Maximum temperatures ranging from somewhat below freezing to 91° occurred during the month. Maximum temperatures of 80°, or higher, were reported from central and southern Florida, the lower Rio Grande Valley, southwestern Arizona, and extreme southeastern California.

Zero temperatures occurred as far south as extreme northern Virginia, southern Tennessee, central Arkansas, southern Indian Territory, southern border of Oklahoma, northwestern Texas, northeastern New Mexico, southern boundary of Utah, and central Nevada. Minimum temperatures of 30°, or more, below zero were reported from portions of Wisconsin, Minnesota, the Dakotas, northeastern Montana, the interior of Maine, and northeastern New Hampshire.

The average temperatures for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	21.3	− 3.2		
Middle Atlantic	12	28.5	− 3.4		
South Atlantic	10	41.6	− 4.3		
Florida Peninsula*	8	55.4	− 4.2		
East Gulf	9	42.8	− 5.6		
West Gulf	7	48.3	− 2.9		
Ohio Valley and Tennessee	11	27.4	− 6.5		
Lower Lake	8	21.0	− 4.3		
Upper Lake	10	14.1	− 3.4		
North Dakota*	8	0.7	− 4.9		
Upper Mississippi Valley	11	16.0	− 5.1		
Missouri Valley	11	15.1	− 5.2		
Northern Slope	7	18.2	+ 0.7		
Middle Slope	6	24.7	− 4.3		
Southern Slope*	6	34.3	− 4.5		
Southern Plateau*	13	40.8	+ 3.1		
Middle Plateau*	8	28.5	+ 3.6		
Northern Plateau*	12	29.1	+ 3.7		
North Pacific	7	41.3	+ 2.0		
Middle Pacific	5	49.4	+ 2.8		
South Pacific	4	55.2	+ 4.6		

* Regular Weather Bureau and selected voluntary stations.

In Canada.—Prof. R. F. Stupart says:

The temperature was a little above the average in Assiniboia, western Manitoba, parts of Saskatchewan, and on Vancouver Island; elsewhere in the Dominion it was below the average, especially from Lake Superior to Cape Breton, many localities recording negative departures of from 5° to 6°, and some few as much as 8°.

The temperature was 10°, or more, below the normal generally over the geographic districts on the following days: New England 4th, 5th, 14th, 15th, 23d, to 26th, and 31st, and in the northern portions on the 6th; Middle Atlantic States 4th, 14th, 15th, 25th to 27th, and 29th to 31st, and in the northern portion on the 5th; South Atlantic States 4th, 7th, 8th, 14th to 16th, and 25th to 27th, and in southern portion on the 5th, and scattered over the district 29th to 31st; Florida Peninsula 4th, 8th, 16th, and 25th to 28th; east Gulf States 4th, 7th, 8th, 14th to 17th, 25th to 27th, and 31st, and in the western portion on the 30th, west Gulf States 13th to 16th, 25th and 26th, in the central portion on the 27th, and scattered on the 30th and 31st; Ohio Valley and Tennessee 4th, 14th to 16th, and 24th to 31st, and scattered on the 3d and 8th to 10th; lower Lake region 14th, 15th, 25th, 26th, and 28th to 30th, and in the eastern portion of the 3d and 4th, western portion on the 10th, and eastern portion on the 31st; upper Lake region 28th to 31st, and in the southwestern portion on the 10th, and scattered 13th to 15th, and 24th to 26th; North Dakota 9th to 11th, 23d to 25th, and 27th to 31st; upper Mississippi Valley 10th, 13th to 15th, 24th to 26th, and 28th to 31st; Missouri Valley 9th to 15th, 24th, 25th, and 29th to 31st, scattered on the 16th, in the southern portion on the 26th, and in the northern portion on the 28th; northern slope 9th to 14th, and 29th to 31st; middle slope 10th to 16th, in the eastern portion 24th to 26th, and scattered 29th to 31st; southern slope 10th to 15th and 25th; middle Plateau in portions 12th to 15th, and 17th; northern Plateau scattered 11th to 13th; and scattered in the north Pacific region on the 12th.

PRECIPITATION.

The distribution of total monthly precipitation is shown on Chart III.

The precipitation during the month was unequally distributed, but it was below the normal in the Ohio Valley and Tennessee, the Southern Atlantic States, Florida Peninsula, upper Lake region, western lower Lake region, upper Mississippi Valley, North Dakota, northern slope region, northern and middle Plateau regions, and the Pacific districts, except north-central and extreme southern California. The precipitation was above the normal in the southern Plateau, and middle and southern slope regions, portions of southern Missouri and southern Illinois, along the coast of eastern Texas, Louisiana, Mississippi, Alabama, western Florida, the southern portion of the Middle Atlantic States, eastern lower Lake region, eastern New England, and north-central and extreme southern California.

The greatest deficiencies in precipitation occurred in the central portions of the South Atlantic States, eastern Tennessee, central Ohio, east-central Texas, west-central Nevada, on the coasts of central and extreme northern California, northwestern Washington, and western Oregon. The greatest excesses in precipitation were reported from central and eastern Arizona, and north-central California.

Precipitation occurred generally over New England on the 2d to 4th, 6th, 7th, 12th, 21st, 22d, 24th to 26th, and 28th. Middle Atlantic States, 2d, 3d, 6th, 7th, 11th to 14th, 24th, 25th, 29th, and 30th. South Atlantic States, 2d, 3d, 6th, 11th to 14th, 19th, 24th, 29th, and 30th. Florida Peninsula, 3d, 6th, and 13th to 15th. East Gulf States, 1st, 2d, 5th, 6th, 9th, 11th to 13th, 19th, 23d, and 29th. West Gulf States, 5th, 8th to 12th, 18th, 28th, and 31st. Ohio Valley and Tennessee, 2d, 3d, 5th to 14th, 19th, 24th, and 29th. Lower Lakes, 2d to 9th, 11th to 16th, 18th, 19th, 21st, 24th, 25th, 27th, 28th, and 31st. Upper Lakes, 1st, 4th to 9th, 11th, 12th, 23d, 24th, 27th, and 31st. Upper Mississippi Valley, 2d, 5th, 9th, 11th, 23d, and 30th. Missouri Valley, 6th, 7th, 10th, 11th, 29th, and 30th. North Dakota, 6th, 8th, 20th, and 23d. Northern slope, 21st to 23d, 28th, and 29th. Middle slope, 10th, 11th, and 29th to 31st. Southern slope, 9th to 12th. Southern Plateau, 1st, 9th, and 10th. Middle Plateau, 11th, 21st, and 22d. Northern Plateau, 13th to 15th, 19th, 21st to 23d, and 27th. North Pacific, 1st to 3d, 12th to 16th, 19th, and 21st to 27th. Middle Pacific, 8th, 12th to 15th, 18th, 20th to 22d, 24th, 30th, and 31st. Southern Pacific, 9th, 15th, 16th, and 21st.

The southern limits of snowfall extended to central Georgia, into the northern portions of Alabama and Mississippi, the southern portion of Arkansas, south-central portion of Texas, southern New Mexico, and central Arizona, and the western limit into east-central and extreme northern California, and to the coasts of Oregon and Washington.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	3.92	106	+0.2	....
Middle Atlantic	12	3.46	100	0.0	....
South Atlantic	10	2.08	50	−2.1	....
Florida Peninsula*	8	1.40	50	−1.4	....
East Gulf	9	5.52	104	+0.2	....
West Gulf	7	2.95	86	−0.5	....
Ohio Valley and Tennessee	11	2.52	60	−1.7	....
Lower Lake	8	2.55	96	−0.1	....
Upper Lake	10	1.43	71	−0.6	....
North Dakota*	8	0.22	42	−0.3	....
Upper Mississippi Valley	11	1.26	76	−0.4	....
Missouri Valley	11	1.09	110	+0.1	....
Northern Slope	7	0.55	85	−0.1	....
Middle Slope	6	0.86	113	+0.1	....
Southern Slope*	6	1.25	76	−0.4	....
Southern Plateau*	13	1.78	182	+0.8	....
Middle Plateau*	8	0.86	74	−0.3	....
Northern Plateau*	12	1.36	66	−0.7	....
North Pacific	7	5.51	73	−2.0	....
Middle Pacific	5	4.91	94	−0.3	....
South Pacific	4	2.00	71	−0.8	....

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Professor Stupart says:

The precipitation was largely above the average in nearly all portions of the Maritime Provinces. In Quebec, at Montreal the average precipitation was slightly exceeded, but in the Province generally it was very deficient. In Ontario, north from Lake Ontario to the Georgian Bay region and east to the boundary, it was generally well above the average and elsewhere generally below, the western and southern counties especially showing a marked deficiency. From the Lake Superior district to the British Columbia coast the precipitation was below the average except in one or two isolated places, noticeably Calgary, which recorded a positive departure of half an inch. The deficiency, however, was not marked except at coast stations and on Vancouver Island, New Westminster giving a negative departure of 1.2 inches and Victoria 2.0 inches.

Depth of snow on ground.—At the close of the month the whole of the Dominion, except a portion of British Columbia, was covered with snow. In the territories of Manitoba the depth, apparently, nowhere exceeded 10 inches, and in Cariboo it is reported as only 18 inches. In the Peninsula of Ontario the depth of snow was also moderate, being in striking contrast to the conditions prevailing at the same time last year when the great depth of snow hampered all kinds of travel. From the Georgian Bay region north and east the amount is from 18 to over 40 inches, in Quebec from 24 to 49 inches, and in the Maritime Provinces from 26 to 46 inches, these amounts being unusually large for the latter Provinces.

HUMIDITY.

The mean relative humidity was normal in North Dakota; below normal in the Atlantic and Gulf States and the upper Lake, northern Plateau, and northern Pacific regions, and above normal in the remaining districts. The positive departures in the northern and middle slope and southern Plateau regions were very marked.

The averages by districts appear in the following table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	73	— 3	Missouri Valley	79	+ 4
Middle Atlantic	74	— 2	Northern Slope	80	+10
South Atlantic	72	— 5	Middle Slope	77	+10
Florida Peninsula	78	— 3	Southern Slope	70	+ 4
East Gulf	77	— 1	Southern Plateau	62	+10
West Gulf	74	— 2	Middle Plateau	74	+ 4
Ohio Valley and Tennessee	78	+ 1	Northern Plateau	84	— 1
Lower Lake	82	+ 1	North Pacific	82	— 4
Upper Lake	81	— 2	Middle Pacific	83	+ 2
North Dakota	80	0	South Pacific	74	+ 2
Upper Mississippi Valley	84	+ 6			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Block Island, R. I.	3	66	n.	Nantucket, Mass.	4	54	ne.
Do	4	63	ne.	Do	7	54	se.
Do	7	53	se.	Do	25	70	ne.
Do	24	51	ne.	Do	26	60	n.
Do	25	70	n.	New Haven, Conn	3	53	ne.
Do	26	54	nw.	New York, N. Y	7	50	se.
Buffalo, N. Y	7	56	w.	North Head, Wash	1	64	se.
Do	8	60	w.	Do	2	70	se.
Do	15	51	w.	Do	3	50	s.
Do	16	54	w.	Do	23	66	se.
Cape Henry, Va	4	50	nw.	Do	24	60	s.
Do	25	58	nw.	Do	25	58	s.
Do	26	53	nw.	Do	26	56	se.
Cleveland, Ohio	25	50	n.	Do	27	60	s.
Columbia, S. C	25	52	nw.	Portland, Me.	7	55	se.
Duluth, Minn	9	50	nw.	Syracuse, N. Y	12	55	s.
Eastport, Me.	7	60	se.	Tatoosh Island, Wash	1	62	s.
Hatteras, N. C	3	56	w.	Do	2	64	s.
Do	6	50	s.	Do	3	50	nw.
Do	25	52	nw.	Do	12	82	e.
Do	26	50	nw.	Do	13	83	e.
Mount Tamalpais, Cal	10	58	nw.	Do	14	68	e.
Do	11	64	nw.	Do	15	60	e.
Mount Weather, Va	1	53	nw.	Do	21	52	e.
Do	4	58	nw.	Do	25	55	s.
Do	25	64	nw.	Do	26	50	s.
Do	26	64	nw.	Do	30	58	e.
Nantucket, Mass.	3	55	ne.	Do	31	70	e.

ATMOSPHERIC ELECTRICITY.

Thunderstorms.—Reports of 148 thunderstorms were received during the current month as against 427 in 1904 and 253 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 11th, 45; 12th, 38; 25th, 10.

Reports were most numerous from: Texas, 45; Arkansas, 20; Oregon, 16.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the dates of full moon, viz, January 17 to 25, inclusive.

In Canada: No thunderstorms were reported. Hamilton, Bermuda, reported thunderstorms on the 20th, 24th, 25th, 26th, and 27th.

Auroras were reported from Grand Manan, 5th, 14th; Father Point, 5th; Quebec, 5th, 14th; White River, 5th; Minnedosa, 1st, 6th, 11th, 15th, 17th, 31st; Qu'Appelle, 6th, 29th, 31st; Swift Current, 16th; Edmonton, 4th, 5th, 6th, 7th, 10th, 17th, 31st; Prince Albert, 17th, 18th; Battleford, 16th, 31st.

CLEAR SKY AND CLOUDINESS.

The cloudiness was normal in New England and the upper Mississippi Valley; below normal in the South Atlantic and east Gulf States, Florida Peninsula, and upper Lake regions; and above normal in the remaining districts.

The distribution of clear sky is graphically shown on Chart IV, and the numerical values of average daylight cloudiness, both for individual stations and by geographic districts, appear in Table I.

The average for the various districts, with departures from the normal, are shown in the following table:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.8	0.0	Missouri Valley	5.5	+ 0.4
Middle Atlantic	6.0	+ 0.4	Northern Slope	5.9	+ 1.3
South Atlantic	4.9	— 0.4	Middle Slope	5.2	+ 1.4
Florida Peninsula	4.3	— 0.4	Southern Slope	4.6	+ 0.8
East Gulf	5.4	— 0.2	Southern Plateau	3.9	+ 1.0
West Gulf	5.7	+ 0.3	Middle Plateau	6.1	+ 1.3
Ohio Valley and Tennessee	6.7	+ 0.3	Northern Plateau	7.6	+ 0.3
Lower Lake	7.6	+ 0.1	North Pacific	7.2	+ 0.1
Upper Lake	6.7	— 0.1	Middle Pacific	6.8	+ 1.7
North Dakota	5.0	+ 0.3	South Pacific	6.1	+ 2.0
Upper Mississippi Valley	5.3	0.0			

DESCRIPTION OF TABLES AND CHARTS.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

Table I gives, for about 137 Weather Bureau stations making two observations daily and for about 31 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,800 stations occupied by voluntary and other cooperating observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station, the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (....).

Table III gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions of the wind based on these two observations only and without considering the velocity. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I.

Table IV gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates per hour (ins.)	3.00	1.80	1.40	1.20	1.08	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table V gives, for about 30 stations furnished by the Canadian Meteorological Service, Prof. R. F. Stupart, director, the means of pressure and temperature, total precipitation and depth of snowfall, and the respective departures from normal values, except in the case of snowfall.

Table VI gives the heights of rivers referred to zeros of gages; it is prepared by the Forecast Division.

NOTES EXPLANATORY OF THE CHARTS.

Chart I, tracks of centers of high areas, and Chart II, tracks of centers of low areas, are prepared by the Forecast Division. The roman numerals show number and chronological order of highs (Chart I) and lows (Chart II). The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the observations at 8 a. m. and 8 p. m., seventy-fifth meridian time. Within each circle is also given (Chart I) the highest barometric reading and (Chart II) the lowest barometric reading at or near the center at that time, and in both cases as reduced to sea level and standard gravity.

Chart III.—Total precipitation. The scale of shades showing the depth of rainfall is given on the chart itself. For isolated stations the rainfall is given in inches and tenths, when appreciable; otherwise, a "trace" is indicated by a capital T, and no rain at all by 0.0.

Chart IV.—Percentage of clear sky. The average cloudiness at each Weather Bureau station is determined by numerous personal observations during the day. The difference between the observed cloudiness and 100, it is assumed, represents the percentage of clear sky, and the values thus obtained have been used in preparing Chart IV.

Chart V.—Hydrographs for seven principal rivers of the United States. Prepared by the Forecast Division.

Chart VI. Isobars and isotherms at 10,000 feet. The mean monthly station pressure for each station has been reduced to the 10,000-foot plane by entering Table 53, pages 789–988, Volume II, Annual Report of the Chief of the Weather Bureau, 1900–1901, with the temperature argument, t, corresponding to θ_2, and correcting the station pressure by the reduction $B_2 - B$ after applying the plateau correction, $C. \Delta\ \theta.\ H$, and the corrections for e and $\Delta\ A$, the argument t being the mean monthly air temperature. This reduction is fully described in the Annual Report of the Chief of the Weather Bureau for 1900–1901, Volume II, pages 772 to 786. The reduction for obtaining B_2 may also be found by using gradients from the station pressure to the height of 10,000 feet, as set forth on pages 18 and 19 of the MONTHLY WEATHER REVIEW for January, 1902.

The isotherms on the 10,000-foot plane have been computed by using the gradients for temperature for each month and station as shown by Table 48, Chapter VIII, Volume II, Report of the Chief of the Weather Bureau, 1900–1901.

Chart VII.—Isobars and isotherms at 3500 feet. The pressure and temperature data entered on this chart are found by the method described for similar data on the 10,000 foot plane.

Chart VIII.—Isobars and isotherms at sea-level and resultant surface winds. The pressures have been reduced to sea level and standard gravity by the method described by Prof. Frank H. Bigelow on pages 13–16 of the REVIEW for January, 1902. The pressures have also been reduced to the mean of the twenty-four hours by the application of a suitable correction to the mean of the 8 a. m. and 8 p. m. readings, at stations taking two observations daily, and to the 8 a. m. or 8 p. m. observation, respectively, at stations taking but a single observation. The diurnal corrections so applied will be found in Table 27, Volume II, Annual Report of the Chief of Weather Bureau, 1900–1901, pp. 140–164.

The isotherms on the sea-level plane have been constructed by means of the data summarized in chapter 8 of the Annual Report of the Chief of the Weather Bureau for 1900–1901, Volume II. The correction $t_0 - t$, or temperature on the sea-level plane minus the station temperature, as given by Table 48 of the above report, is added to the observed surface temperature to obtain the adopted sea-level temperature.

The resultant wind directions are computed from observations at 8 a. m. and 8 p. m. daily. The resultant durations are shown by figures attached to the arrows.

Chart IX.—Isobars at sea-level; surface isotherms; resultant winds.

Chart X.—The total snowfall. This is based on the reports from regular and voluntary observers, and shows the depth in inches of the snowfall during the month. In general, the depth is shown by lines inclosing areas of equal snowfall, but in special cases figures are also given.

Chart XI.—Depth of snow on ground at end of month.

When there is no snow the last two charts are omitted.

TABLE I.—*Climatological data for Weather Bureau stations, January, 1905.*

Stations.	Elevation of instruments: Barometer above sea level, feet.	Elevation of instruments: Thermometers above ground.	Elevation of instruments: Anemometer above ground.	Pressure, in inches: Actual, reduced to mean of 24 hours.	Pressure, in inches: Sea level, reduced to mean of 24 hrs.	Pressure, in inches: Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. + mean min. ÷ 2.	Temperature: Departure from normal.	Temperature: Maximum.	Temperature: Date.	Temperature: Mean maximum.	Temperature: Minimum.	Temperature: Date.	Temperature: Mean minimum.	Temperature: Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Precipitation: Departure from normal.	Precipitation: Days with .01, or more.	Wind: Total movement, miles.	Wind: Prevailing direction.	Wind: Maximum velocity: Miles per hour.	Wind: Maximum velocity: Direction.	Wind: Maximum velocity: Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
New England.							21.3	− 3.2										73	3.92	+ 0.2										5.8	
Eastport	76	69	82	29.92	30.01	+ .01	16.6	− 3.8	49	7	24	−10	15	9	30	15	12	80	4.14	+ 0.2	13	11,882	nw.	60	se.	7	7	12	12	6.2	36.3
Portland, Me.	103	81	117	29.93	30.06	+ .01	17.9	− 4.6	47	7	25	−10	15	10	34	16	11	76	5.16	+ 1.5	13	8,376	nw.	55	se.	7	12	12	7	4.8	43.2
Concord	288	70	79	29.72	30.05	.00	17.8	− 3.2	46	7	26	−15	15	9	32	....	....	....	4.10	+ 0.8	14	4,635	nw.	26	sw.	8	9	8	14	6.3	24.8
Northfield	876	16	60	29.09	30.10	+ .05	11.6	− 3.9	46	7	22	−23	15	1	37	10	6	75	1.53	− 1.2	14	6,706	n.	38	sw.	8	5	9	17	7.0	12.6
Boston	125	115	181	29.93	30.07	+ .02	25.1	− 1.9	52	1	32	4	6	18	30	22	16	68	4.09	0.0	10	9,705	nw.	44	se.	7	11	7	13	5.9	21.3
Nantucket	12	14	90	30.04	30.05	+ .01	29.0	− 2.4	50	7	35	10	5	28	20	26	23	79	5.70	+ 2.0	13	14,356	nw.	70	ne.	25	7	8	16	6.8	32.4
Block Island	26	11	46	30.05	30.08	+ .01	27.8	− 3.3	50	7	34	8	26	22	22	25	20	73	2.46	− 1.7	10	17,972	nw.	70	n.	25	9	13	9	5.4	5.7
Providence	159	57	67	29.90	30.09	+ .03	25.3	......	50	7	34	4	5	17	32	21	15	68	2.45	......	10	6,616	nw.	38	se.	7	12	8	11	5.4	13.6
Hartford	159	115	132	29.92	30.11	+ .04	23.3	......	53	7	31	− 1	24	16	33	20	14	72	4.64	......	11	6,035	n.	41	se.	7	10	14	7	4.9	27.1
New Haven	106	116	154	29.98	30.11	+ .03	24.6	− 2.9	52	1	32	1	26	17	31	21	15	68	4.14	− 0.2	10	8,362	n.	53	ne.	3	12	9	10	4.8	19.5
Mid. Atlantic States.							28.5	− 3.4										74	3.46	0.0										6.0	
Albany	97	102	115	30.02	30.13	+ .06	20.7	− 2.5	52	7	28	− 6	26	14	30	19	15	78	2.66	− 0.2	9	6,820	nw.	43	se.	7	8	10	13	6.4	18.2
Binghamton	875	79	90	29.13	30.10	+ .02	19.8	− 2.6	51	1	27	− 8	31	12	29	....	....	....	2.37	− 0.6	15	5,787	w.	32	se.	6	6	11	14	6.4	20.9
New York	314	108	350	29.76	30.11	+ .01	27.5	− 3.0	52	7	34	0	26	22	25	25	21	77	3.93	− 0.1	12	12,364	w.	50	se.	7	9	9	13	6.0	19.3
Harrisburg	374	94	104	29.73	30.16	+ .06	26.0	− 4.3	58	1	32	2	26	19	24	23	18	71	4.15	+ 0.5	14	6,544	w.	28	nw.	4	9	6	16	6.5	21.2
Philadelphia	117	116	184	30.01	30.14	+ .03	29.8	− 2.2	58	1	36	6	26	24	24	26	20	69	3.12	− 0.3	13	9,085	nw.	47	ne.	25	7	9	15	6.0	11.6
Scranton	805	111	119	29.23	30.14	+ .05	23.4	......	53	1	30	− 2	26	16	30	21	17	79	4.41	......	20	6,637	sw.	42	se.	7	2	13	16	7.9	27.6
Atlantic City	52	39	48	30.07	30.13	+ .02	29.5	− 3.0	59	1	37	5	26	22	23	26	21	74	4.74	+ 0.9	12	6,927	nw.	45	ne.	25	11	5	15	5.6	22.3
Cape May	17	48	52	30.14	30.16	+ .04	30.2	− 4.2	57	1	36	7	26	24	24	28	....	....	3.80	0.0	10	7,556	nw.	40	nw.	26	10	13	8	5.4	23.0
Baltimore	123	69	117	30.00	30.14	+ .02	30.8	− 3.2	64	1	38	6	26	24	23	26	20	66	4.69	+ 1.4	12	6,335	nw.	32	nw.	4	8	6	17	6.5	15.0
Washington	112	59	76	30.04	30.16	+ .03	29.8	− 3.4	65	1	38	− 2	31	21	29	26	20	69	3.59	+ 0.1	12	5,798	nw.	44	nw.	25	8	9	14	6.3	13.5
Lynchburg	681	83	88	29.40	30.17	+ .04	33.2	− 3.6	67	1	42	11	26	24	29	28	23	72	3.11	− 0.8	9	3,784	nw.	34	nw.	26	11	11	9	5.3	5.8
Mount Weather	1,725	10	57	28.23	30.12	......	24.2	......	59	1	31	− 2	26	18	39	22	18	79	3.33	......	11	15,120	nw.	64	nw.	25	11	5	15	5.9	13.9
Norfolk	91	102	111	30.07	30.17	+ .04	36.5	− 3.9	67	12	44	12	26	28	30	32	26	70	2.99	− 0.8	12	7,402	ne.	39	sw.	7	13	7	11	5.3	3.3
Richmond	144	82	90	30.01	30.17	+ .04	35.0	......	68	1	44	11	31	26	30	....	....	....	2.47	......	10	4,382	sw.	23	nw.	25	14	6	11	5.0	6.5
Wytheville	2,293	40	47	27.71	30.19	+ .05	27.8	− 4.4	55	1	36	− 1	25	19	33	25	21	81	2.37	− 0.7	10	5,408	w.	27	nw.	3	8	9	14	6.0	12.9
S. Atlantic States.							41.6	− 4.3										72	2.08	− 2.1										4.9	
Asheville	2,255	53	75	27.77	30.18	+ .03	32.0	− 4.8	60	1	41	− 1	25	23	32	27	22	74	2.85	− 1.5	10	7,062	nw.	37	nw.	3	8	11	12	6.1	2.6
Charlotte	773	68	76	29.33	30.20	+ .05	37.0	− 4.2	65	1	45	12	26	28	28	31	24	66	2.11	− 3.0	10	5,119	sw.	25	nw.	25	12	4	15	5.4	T.
Hatteras	11	12	47	30.14	30.15	+ .01	41.8	− 3.9	68	12	48	20	27	36	26	38	34	80	3.04	− 2.9	10	13,351	n.	56	w.	3	17	7	7	4.3	T.
Raleigh	376	71	79	29.76	30.18	+ .05	36.9	− 3.9	66	1	46	13	26	28	29	32	26	69	2.37	− 1.2	10	4,882	nw.	29	nw.	25	12	7	12	5.0	1.0
Wilmington	78	82	90	30.08	30.17	+ .03	42.0	− 4.9	72	12	52	16	27	32	30	36	30	70	1.80	− 2.1	9	6,231	nw.	34	nw.	3	15	11	5	4.1	0.0
Charleston	48	14	92	30.15	30.20	+ .05	45.8	− 4.2	69	1	54	17	26	38	30	41	37	79	1.32	− 2.7	7	7,898	se.	36	n.	14	12	14	5	4.6	T.
Columbia, S. C.	351	167	175	29.80	30.19	+ .04	41.8	− 3.8	67	12	51	14	26	33	29	36	28	64	1.71	− 2.1	9	7,607	w.	52	nw.	25	10	6	15	6.2	T.
Augusta	180	89	97	30.02	30.22	+ .06	42.4	− 4.2	69	1	52	14	26	32	35	37	32	72	1.73	− 2.7	10	4,917	w.	37	w.	3	10	14	7	4.6	T.
Savannah	65	81	89	30.14	30.22	+ .07	47.0	− 4.0	73	12	56	16	26	38	31	40	34	68	2.06	− 1.2	10	5,683	nw.	35	nw.	3	13	9	9	4.7	T.
Jacksonville	43	101	129	30.15	30.20	+ .05	49.8	− 5.4	75	12	59	17	26	40	28	43	39	74	1.80	− 1.5	6	7,168	nw.	35	w.	3	15	6	10	4.3	
Florida Peninsula.							59.8	− 4.9										78	0.83	− 2.1										4.3	
Jupiter	28	10	48	30.14	30.17	+ .07	60.8	− 4.9	81	13	70	24	26	52	33	55	51	77	1.40	− 2.5	7	9,368	nw.	35	se.	5	13	13	5	4.4	
Key West	22	10	53	30.14	30.16	+ .06	63.4	− 6.3	83	13	68	44	26	58	18	59	56	82	0.69	− 1.4	8	8,533	ne.	34	nw.	3	13	10	8	5.1	
Tampa	34	79	96	30.16	30.20	+ .08	55.2	− 3.5	79	12	65	23	26	45	32	48	44	76	0.40	− 2.3	4	6,287	nw.	33	nw.	3	18	9	4	3.5	
East Gulf States.							42.8	− 5.6										77	5.52	+ 0.2										5.4	
Atlanta	1,174	190	216	28.95	30.23	+ .08	36.6	− 5.9	65	1	44	6	25	29	25	33	29	76	3.93	− 1.8	10	9,957	nw.	48	nw.	25	8	10	13	5.8	T.
Macon	370	93	99	29.82	30.24	+ .08	41.8	......	68	1	52	13	26	32	34	....	....	....	1.50	......	9	5,216	nw.	36	nw.	25	10	8	13	5.7	T.
Pensacola	56	79	96	30.20	30.26	+ .12	47.1	− 5.4	68	12	55	18	26	39	27	....	....	....	6.39	+ 1.7	10	7,871	n.	41	nw.	25	9	13	9	5.2	0.0
Birmingham	700	136	143	29.48	30.27	+ .11	37.8	− 7.9	65	2	46	7	25	29	27	....	....	....	5.59	− 0.1	12	6,025	nw.	30	se.	11	10	6	15	6.0	T.
Mobile	57	88	96	30.20	30.26	+ .11	45.8	− 4.7	70	12	54	17	26	38	31	41	36	73	5.53	+ 0.4	9	6,136	n.	34	nw.	25	8	13	10	5.3	0.0
Montgomery	223	100	112	30.01	30.28	+ .12	42.3	− 6.0	70	2	51	12	26	33	33	39	36	83	4.99	− 0.4	9	5,746	nw.	30	nw.	25	14	8	9	4.5	0.0
Meridian	375	84	93	29.86	30.28	+ .12	40.8	− 6.2	67	10	50	13	26	32	35	....	....	....	6.06	+ 0.9	11	4,714	n.	28	w.	6	13	4	14	5.3	0.0
Vicksburg	247	62	74	29.98	30.28	+ .13	42.6	− 4.7	72	11	50	15	26	35	27	38	34	76	5.33	− 0.2	11	5,434	n.	30	nw.	2	9	7	15	6.0	0.0
New Orleans	51	88	121	30.20	30.26	+ .13	49.6	− 4.2	73	1	58	22	26	42	26	45	40	75	6.31	+ 1.1	8	7,646	n.	32	s.	11	10	10	11	5.0	0.0
West Gulf States.							43.8	− 2.9										74	2.95	− 0.5										5.7	
Shreveport	249	77	84	30.01	30.30	+ .16	41.0	− 4.9	73	11	48	17	26	34	33	37	32	74	4.13	− 0.5	9	5,754	se.	31	se.	11	12	4	15	6.1	T.
Fort Smith	457	79	94	29.79	30.30	+ .16	32.2	− 3.9	66	1	40	2	25	24	27	29	24	73	3.25	+ 0.9	8	7,217	e.	36	nw.	2	9	10	12	5.7	3.0
Little Rock	357	93	100	29.91	30.31	+ .16	34.4	− 6.4	65	1	42	5	25	26	38	31	25	72	4.03	− 0.8	8	6,463	nw.	35	nw.	2	10	12	9	5.3	3.0
Corpus Christi	20	48	53	30.21	30.23	+ .13	54.8	− 0.7	77	11	62	26	14	47	33	50	46	79	0.87	− 2.0	9	7,542	se.	34	s.	11	8	7	16	6.4	0.0
Fort Worth	670	106	114	29.55	30.29	+ .17	38.2	......	72	1	46	11	15	30	33	....	....	....	1.52	......	7	8,327	nw.	32	sw.	4	16	3	12	5.0	0.0
Galveston	54	106	112	30.19	30.25	+ .12	51.0	− 1.7	69	1	56	27	26	46	19	49	46	85	5.40	+ 1.7	10	9,703	n.	39	n.	13	13	4	14	5.3	0.0
Palestine	510	73	79	29.72	30.27	+ .15	43.0	− 0.8	69	20	51	18	15	35	32	38	33	73	2.06	− 2.2	9	5,624	n.	24	n.	2	13	5	13	5.5	0.0
San Antonio	701	80	91	29.48	30.23	+ .13	49.9	− 1.6	80	11	60	24	16	40	37	43	36	64	0.88	− 0.8	8	5,863	n.	33	n.	2	12	6	13	5.4	0.0
Taylor	583	55	63	29.64	30.26	+ .15	45.4	......	76	20	56	16	26	35	39	....	....	....	1.19	......	10	7,428	n.	29	n.	12	8	11	12	6.2	0.0
Ohio Val. and Tenn.							27.4	− 6.5										78	2.52	− 1.7										6.7	
Chattanooga	762	106	112	29.44	30.28	+ .12	33.8	− 7.2	65	1	42	2	25	26	28	30	26	73	2.69	− 3.5	10	5,609	w.	32	nw.	25	8	8	15	6.1	6.1
Knoxville	1,004	35	88	29.16	30.25	+ .10	31.2	− 6.5	63	1	39	2	25	23	32	28	25	81	3.24	− 2.3	11	4,723	nw.	34	w.	7	5	5	21	7.3	11.8
Memphis	399	146	154	29.88	30.32	+ .16	32.9	− 7.0	66	1	40	3	25	26	39	30	26	76	4.15	− 1.4	12	7,710	nw.	36	nw.	2	10	7	14	6.1	6.8
Nashville	546	122	134	29.70	30.30	+ .14	30.3	− 7.9	64	1	38	− 2	25	22	30	28	24	80	3.17	− 1.9	11	5,269	nw.	30	s.	11	9	6	16	6.2	14.3
Lexington	989	75	102	29.14	30.27	+ .14	24.4	− 8.7	60	1	32	− 6	25	17	25	....	....	....	2.04	− 1.8	16	8,744	sw.	36	nw.	24	6	12	13	6.5	19.3
Louisville	525	114	136	29.68	30.29	+ .15	27.8	− 6.3	64	1	36	− 3	25	20	32	25	20	75	2.24	− 1.8	12	7,008	sw.	36	nw.	24	6	11	14	6.5	8.7
Evansville	431	72	82	29.80	30.29	+ .15	27.2	......	62	1	34	− 4	25	20	30	....	....	....	3.25	......	10	6,039	nw.	24	w.	7	6	12	13	6.3	9.5
Indianapolis	822	154	164	29.32	30.25	+ .13	23.2	− 5.1	57	1	30	− 4	25	16	32	21	18	82	1.43	− 1.6	11	7,934	nw.	30	sw.	27	5	10	16	6.8	6.8
Cincinnati	628	152	160	29.54	30.26	+ .14	25.8	− 6.7	61	1	34	− 1	25	18	36	24	19	75	1.80	− 1.7	16	6,122	sw.	26	w.	24	6	12	13	6.5	10.1
Columbus	824	173	190	29.30	30.21	+ .10	24.0	− 4.4	56	1	32	1	15	16	30	22	19	84	1.25	− 2.1	12	9,684	sw.	40	n.	2	5	9	17	6.9	9.4
Pittsburg	842	336	352	29.24	30.18	+ .07	26.2	− 4.4	57	1	34	0	29	18	31	23	18	74	2.36	− 0.8	16	8,632	sw.	39	sw.	8	4	5	22	8.0	17.2
Parkersburg	638	77	84	29.53	30.22	+ .10	25.7	− 7.3	60	2	34	− 5	29	18	29	23	20	79	2.34	− 1.2	14	5,043	w.	24	nw.	24	9	8	14	6.2	14.8
Elkins	1,940	41	50	28.05	30.18	+ .06	23.6	− 6.2	57	1	33	− 4	29	14	38	22	19	82	3.48	− 0.5	21	3,406	w.	19	w.	27	4	3	24	8.0	36.6
Lower Lake Region.							21.0	− 4.3										82	2.55	− 0.1										7.6	
Buffalo	767	178	206	29.26	30.13	+ .06	20.0	− 4.4	43	12	26	0	26	14	24	18	15	82	4.48	+ 1.5	27	13,874	w.	60	w.	8	1	6	24	8.6	37.4
Oswego	335	76	91	29.73	30.12	+ .05	19.2	− 5.1	42	1	25	− 3	31	13	21	18	16	85	3.03	+ 0.1	23	11,191	se.	42	ne.	25	3	5	23	8.2	26.6
Rochester	523	81	102	29.54	30.14	+ .07	20.4	− 3.5	45	1	26	2	26	15	21	18	16	83	2.80	− 0.3	21	8,403	sw.	33	w.	10	2	7	22	8.2	27.5
Syracuse	597	97	113	29.44	30.11	+ .04	18.8	......	46	12	25	− 8	26	12	24	....	....	....	2.07	......	13	10,670	sw.	55	s.	12	1	11	19	7.5	16.7
Erie	713	92	102	29.34	30.15	+ .07	22.3	− 4.6	51	1	29	2	26	16	34	20	17	81	2.74	− 0.6	20	9,396	sw.	39	s.	11	2	7	22	8.1	21.8
Cleveland	762	190	201	29.32	30.18	+ .09	22.4	− 3.8	56	1	29	− 2	29	16	32	20	15	74	2.05	− 0.5	20	12,750	sw.	50	n.	25	2	12	17	7.7	14.8
Sandusky	629	62	70	29.47	30.18	+ .09	22.4	− 4.1	57	1	29	1	10	16	29	....	....	....	1.69	− 0.5	16	7,295	sw.	32	n.	25	10	4	17	6.2	7.8
Toledo	628	120	127	29.48	30.19	+ .10	21.2	− 4.9	56	1	28	− 2	10	14	30	19	16	81	1.70	− 0.4	13	8,382	sw.	30	n.	25	5	11	15	6.5	10.5
Detroit	730	153	193	29.34	30.17	+ .09	20.4	− 4.1	47	1	26	0	10	14	25	19	17	86	1.93	0.0	13	9,236	sw.	36	e.	11	5	12	14	7.1	13.5
Upper Lake Region.							14.1	− 3.4										81	1.43	− 0.6										6.7	
Alpena	609	63	80	29.46	30.16	+ .12	16.0	− 2.1	38	1	23	− 6	26	9	29	14	10	82	1.98	− 0.5	16	8,220	w.	38	e.	11	4	15	12	6.6	19.8
Escanaba	612	40	48	29.49	30.20	+ .15	12.0	− 2.0	37	1	20	− 9	23	4	26	10	6	81	1.55	0.0	11	6,696	nw.	30	nw.	24	10	5	16	6.3	15.3
Grand Rapids	707	127	165	29.38	30.18	+ .11	19.8	− 4.0	40	1	26	1	26	14	24	19	16	86	1.64	− 1.3	19	8,507	nw.	40	w.	9	2	5	24	8.1	14.5
Houghton	668	66	74	29.42	30.19	+ .14	13.1	......	36	1	20	− 6	26	7	32	....	....	....	2.78	......	22	6,268	nw.	31	ne.	24	5	5	21	7.9	29.4
Marquette	734	76	116	29.34	30.19	+ .15	14.4	− 1.6	36	1	20	− 3	22	9	21	12	8	77	1.76	− 0.3	17	9,554	w.	38	nw.	24	1	12	18	7.2	18.4
Port Huron	638	70	120	29.45	30.18	+ .12	18.6	− 3.2	42	1	25	− 3	29	12	25	17	14	84	1.56	− 0.5	15	9,711	sw.	42	n.	2	5	4	22	7.8	17.0
Sault Ste. Marie	614	40	61	29.43	30.17	+ .14	11.4	− 2.9	38	1	18	−10	26	4	30	10	7	85	0.64	− 1.2	16	6,930	nw.	40	w.	10	5	5	21	7.4	6.5
Chicago	823	241	274	29.31	30.24	+ .14	18.1	− 5.3	48	1	25	− 5	14	11	30	17	14	82	1.33	− 0.8	13	13,278	nw.	46	w.	15	8	8	15	6.4	8.5
Milwaukee	681	124	142	29.45	30.23	+ .15	15.2	− 4.2	40	1	22	−10	14	8	30	13	9	75	1.62	− 0.6	11	9,092	w.	42	e.	11	10	8	13	5.5	14.7
Green Bay	617	49	86	29.52	30.23	+ .17	10.2	− 4.0	34	1	19	−15	14	2	29	8	3	75	1.43	− 0.4	12	8,276	sw.	40	w.	9	12	6	13	5.5	17.3
Duluth	1,133	11	47	28.96	30.27	+ .18	5.5	− 4.5	36	1	14	−21	10	− 3	29	3	1	84	0.78	− 0.3	9	11,260	nw.	50	nw.	9	12	13	6	4.5	9.0

TABLE I.—*Climatological data for Weather Bureau stations, January, 1905*—Continued.

Stations.	Elevation of instruments. Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Temperature of the air, in degrees Fahrenheit. Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches. Total.	Departure from normal.	Days with .01, or more.	Wind. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
North Dakota.							**1.1**	**– 1.4**										**80**	**0.26**	**– 0.4**										**5.0**	
Moorhead	935	8	57	29.30	30.40	+ .26	1.4	+ 2.3	34	18	12	–28	10	– 9	30	0	– 2	90	0.36	– 0.4	6	6,133	nw.	28	nw.	9	14	11	6	4.1	3.6
Bismarck	1,674	16	29	28.50	30.43	+ .30	1.8	– 2.7	38	4	11	–27	30	– 8	32	0	– 7	68	0.31	– 0.2	6	6,386	nw.	42	nw.	4	12	4	15	5.5	3.1
Devils Lake	1,482	11	44	28.67	30.40	+ .28	– 3.5	......	30	18	8	–33	10	–14	33	–5	– 8	82	0.28	......	7	8,617	w.	36	nw.	8	11	13	7	4.6	2.8
Williston	1,875	14	44	28.26	30.40	+ .29	0.2	– 3.7	36	3	11	–29	29	–11	39	–1	– 3	86	0.10	– 0.5	5	5,634	nw.	38	nw.	8	8	12	11	5.7	1.1
Upper Miss. Valley.							**16.0**	**– 5.1**										**84**	**1.26**	**– 0.4**										**5.3**	
Minneapolis	......	102	208	......	......	......	7.4	– 4.5	36	1	16	–18	10	– 1	35	......	......	......	0.71	– 0.1	8	8,300	w.	36	w.	9	12	11	8	......	13.1
St. Paul	837	171	179	29.34	30.30	+ .19	7.1	– 3.5	39	1	14	–17	10	0	30	6	3	84	0.75	– 0.2	7	7,662	nw.	36	n.	24	14	6	11	4.9	8.6
La Crosse	714	71	87	29.49	30.32	+ .21	8.6	– 6.1	35	1	18	–15	10	0	34	......	......	......	0.62	– 0.7	7	4,961	w.	32	nw.	9	15	7	9	4.5	9.0
Madison	974	70	78	29.14	30.26	+ .16	10.4	......	37	1	18	–15	14	3	32	9	7	89	0.77	– 0.9	10	8,064	nw.	40	n.	2	15	9	7	4.2	9.1
Charles City	1,015	8	58	29.16	30.32	+ .18	4.6	......	37	1	16	–24	30	– 6	37	4	3	96	0.86	– 0.1	9	5,594	nw.	33	nw.	9	10	12	9	5.1	10.6
Davenport	606	71	79	29.60	30.31	+ .19	15.7	– 4.3	51	1	24	– 9	14	7	30	14	12	88	0.63	– 1.0	7	5,982	nw.	28	nw.	9	12	7	12	5.3	7.2
Des Moines	861	84	99	29.38	30.36	+ .22	12.8	– 4.7	45	1	22	–15	25	4	32	11	8	82	1.08	– 0.3	12	6,056	nw.	32	nw.	24	8	11	12	5.7	14.1
Dubuque	698	100	117	29.50	30.31	+ .19	12.0	– 5.3	44	1	21	–12	30	3	30	10	7	83	0.95	– 0.7	7	4,870	nw.	28	nw.	9	15	6	10	4.6	9.6
Keokuk	614	63	78	29.61	30.33	+ .19	19.6	– 3.6	56	1	28	–10	25	12	34	16	12	77	0.60	– 1.1	8	6,431	nw.	30	nw.	24	14	6	11	4.6	4.6
Cairo	356	87	93	29.92	30.32	+ .16	27.8	– 6.9	64	1	35	– 3	25	21	29	26	22	81	3.41	– 0.4	9	7,041	n.	36	nw.	24	5	13	13	6.8	7.7
La Salle	536	56	64	29.68	30.29	+ .18	17.2	......	50	1	25	– 8	10	9	31	......	......	......	0.90	......	10	6,637	w.	30	nw.	24	11	6	14	5.6	8.8
Springfield, Ill	644	82	93	29.57	30.30	+ .17	20.4	– 5.1	61	1	28	– 8	25	13	36	19	16	85	2.13	+ 0.1	8	7,535	nw.	32	nw.	24	7	11	13	6.3	5.0
Hannibal	534	75	109	29.71	30.32	+ .19	20.6	– 5.3	64	1	29	– 7	24	12	37	......	......	......	1.45	– 0.8	9	7,173	nw.	31	nw.	24	9	9	13	5.6	5.7
St. Louis	567	208	217	29.66	30.30	+ .16	24.2	– 6.3	65	1	32	– 6	25	17	36	21	17	76	2.47	+ 0.3	8	9,217	nw.	42	nw.	24	8	12	11	5.6	6.8
Missouri Valley.							**15.1**	**– 5.2**										**79**	**1.09**	**+ 0.1**										**5.5**	
Columbia, Mo	784	11	84	29.45	30.32	+ .19	20.8	– 9.8	66	1	29	– 9	25	12	38	......	......	......	1.97	– 0.3	8	6,712	nw.	32	nw.	24	13	8	10	5.2	7.5
Kansas City	963	78	95	29.28	30.38	+ .23	21.0	– 4.4	60	1	29	–11	25	13	35	19	16	83	0.82	– 0.4	8	6,544	nw.	28	nw.	25	9	12	10	5.0	4.4
Springfield, Mo	1,324	98	104	28.84	30.31	+ .17	24.4	– 7.9	64	1	32	–11	25	17	30	22	18	77	3.21	+ 0.7	7	7,979	nw.	38	w.	11	15	3	13	5.2	5.4
Topeka	......	85	89	......	......	......	20.0	– 6.8	52	1	28	–13	25	12	36	......	......	......	0.98	0.0	7	6,756	nw.	30	nw.	2	10	17	4	4.7	6.7
Lincoln	1,189	75	84	29.02	30.37	+ .22	14.8	– 7.3	53	4	23	–21	25	6	29	12	9	80	0.93	+ 0.3	11	7,357	nw.	36	n.	9	8	13	10	5.4	10.1
Omaha	1,105	115	121	29.11	30.38	+ .23	14.3	– 4.9	50	4	22	–18	25	6	28	12	7	76	1.13	+ 0.4	10	7,230	n.	36	n.	24	8	10	13	6.0	14.2
Valentine	2,598	47	54	27.48	30.37	+ .25	13.9	– 3.0	55	3	25	–26	13	3	45	11	7	79	1.01	+ 0.4	9	6,864	nw.	38	nw.	4	8	14	9	5.5	10.1
Sioux City	1,135	96	164	29.06	30.36	+ .21	10.0	– 6.3	47	1	18	–25	25	1	30	......	......	......	0.67	0.0	6	8,735	nw.	38	nw.	5	11	6	14	5.6	13.4
Pierre	1,572	43	50	28.64	30.41	+ .28	11.2	– 1.5	51	18	20	–19	25	3	33	9	3	70	0.35	– 0.2	6	4,756	nw.	26	nw.	4	8	11	12	5.6	5.8
Huron	1,306	56	67	28.91	30.41	+ .25	5.8	– 1.2	39	18	16	–28	25	–5	36	5	2	88	0.36	– 0.1	9	7,525	nw.	42	nw.	4	8	12	11	6.2	4.4
Yankton	1,233	55	65	28.97	30.38	+ .22	10.3	– 3.9	47	4	20	–25	25	1	31	......	......	......	0.58	0.0	6	5,851	nw.	32	nw.	6	7	10	14	6.5	9.8
Northern Slope.							**18.2**	**+ 0.7**										**80**	**0.55**	**– 0.1**										**5.9**	
Havre	2,505	11	44	27.58	30.39	+ .29	10.0	+ 0.3	50	3	20	–35	31	0	39	9	7	89	0.85	0.0	8	5,360	e.	38	sw.	2	7	11	13	5.9	8.5
Miles City	2,371	42	50	27.70	30.39	+ .27	15.3	+ 4.7	46	18	24	–14	14	7	32	12	11	94	0.28	– 0.3	6	......	s.	......	......	......	20	7	4	3.9	2.8
Helena	4,110	8	56	25.94	30.32	+ .17	21.2	+ 4.1	50	25	29	–12	31	14	33	18	14	73	0.20	– 1.2	6	3,805	sw.	36	w.	3	7	9	15	6.6	3.3
Kalispell	2,962	11	34	27.08	30.26	+ .14	24.1	......	42	25	30	– 1	12	18	21	23	20	83	1.33	......	16	2,963	w.	20	sw.	25	7	3	21	7.2	9.6
Rapid City	3,234	46	50	26.76	30.40	+ .30	17.6	– 2.6	54	19	28	–15	31	8	39	24	11	81	0.52	+ 0.2	10	5,312	nw.	34	nw.	25	14	6	11	4.8	5.2
Cheyenne	6,088	56	64	24.04	30.25	+ .20	23.7	– 1.3	51	27	33	–20	11	14	45	21	15	69	0.84	+ 0.5	11	7,435	nw.	37	nw.	2	2	17	12	6.7	14.0
Lander	5,372	26	36	24.71	30.30	+ .18	20.0	+ 0.1	54	3	32	–17	13	8	39	17	14	83	0.23	– 0.2	4	1,552	ne.	15	nw.	3	5	18	8	5.5	2.3
Yellowstone Park	6,200	11	47	23.92	30.28	+ .14	19.9	......	43	25	28	–16	31	12	26	17	13	75	0.25	......	6	4,389	s.	26	sw.	25	2	13	16	7.0	3.9
North Platte	2,821	43	52	27.28	30.36	+ .24	19.8	– 0.2	59	3	30	–20	13	10	45	16	12	76	0.90	+ 0.4	7	5,565	w.	34	nw.	1	9	14	8	5.3	11.0
Middle Slope.							**24.7**	**– 4.3**										**77**	**0.86**	**+ 0.1**										**5.2**	
Denver	5,291	129	136	24.79	30.24	+ .19	27.4	– 0.8	60	3	37	–13	13	18	35	24	18	71	0.99	+ 0.4	5	4,804	s.	32	ne.	6	11	7	13	5.5	7.0
Pueblo	4,685	80	86	25.37	30.22	+ .17	28.6	– 0.1	64	3	40	–12	13	17	44	23	17	68	0.32	– 0.1	8	4,230	nw.	31	n.	1	9	15	7	5.4	2.3
Concordia	1,398	42	47	28.81	30.37	+ .23	18.1	– 5.1	55	4	26	–16	25	10	34	16	12	82	0.75	+ 0.1	5	4,573	nw.	28	nw.	5	9	12	10	5.2	7.6
Dodge	2,509	44	54	27.61	30.35	+ .24	22.4	– 4.2	60	3	31	–17	15	13	38	20	17	83	0.84	+ 0.4	5	6,791	nw.	30	s.	17	12	7	12	5.6	5.7
Wichita	1,358	78	86	28.85	30.36	+ .23	23.2	– 7.4	54	1	32	–11	15	15	38	20	15	75	0.45	– 0.5	4	6,682	n.	32	n.	1	16	9	6	4.0	4.9
Oklahoma	1,214	79	86	28.97	30.31	+ .20	28.6	– 8.4	63	1	36	– 2	15	21	36	26	23	82	1.81	+ 0.3	9	8,495	n.	35	n.	2	11	6	14	5.8	2.5
Southern Slope.							**34.7**	**– 2.6**										**70**	**1.06**	**+ 0.2**										**4.6**	
Abilene	1,738	45	54	28.40	30.28	+ .19	38.4	– 4.4	73	1	48	10	15	29	39	32	24	62	1.11	+ 0.2	3	6,110	nw.	28	w.	18	11	9	11	5.2	0.0
Amarillo	3,676	10	49	26.38	30.24	+ .18	31.0	– 0.9	67	30	41	– 6	13	21	43	26	22	78	1.00	+ 0.3	7	8,151	nw.	36	nw.	1	16	8	7	4.1	9.8
Roswell	3,578	9	57	26.50	30.24	+ .20	38.6	......	69	23	52	15	15	25	46	32	26	70	0.55	......	7	4,094	s.	35	ne.	1	13	10	8	4.5	T.
Southern Plateau.							**43.2**	**+ 2.6**										**62**	**1.72**	**+ 0.8**										**3.9**	
El Paso	3,762	10	110	26.31	30.14	+ .13	45.8	+ 1.3	74	31	59	23	4	32	40	37	29	57	0.86	+ 0.3	3	6,073	nw.	42	ne.	2	18	10	3	3.1	0.0
Santa Fe	7,013	33	39	23.28	30.22	+ .18	28.2	+ 0.3	48	31	38	8	2	19	28	23	18	70	1.28	+ 0.7	7	5,686	ne.	30	n.	23	21	7	3	3.0	11.9
Flagstaff	6,907	12	25	23.38	30.12	+ .07	21.0	+ 0.2	55	25	44	2	14	14	42	24	20	75	3.20	+ 1.1	7	3,831	n.	42	ne.	2	11	8	12	5.4	24.9
Phoenix	1,108	50	56	28.89	30.06	+ .03	55.2	+ 5.4	78	24	67	31	5	43	37	47	39	61	3.31	+ 2.5	8	2,638	e.	22	sw.	10	15	9	7	3.9	0.0
Yuma	141	16	46	29.90	30.06	+ .01	58.8	+ 4.6	78	29	70	39	17	48	29	49	38	52	1.15	+ 0.7	4	4,335	n.	24	n.	2	23	4	4	2.1	0.0
Independence	3,910	11	42	26.06	30.10	+ .03	42.4	+ 4.0	62	29	54	22	12	31	31	35	25	55	0.54	– 0.7	3	3,935	nw.	38	nw.	4	7	14	10	5.7	0.0
Middle Plateau.							**32.1**	**+ 3.4**										**74**	**0.67**	**– 0.6**										**6.1**	
Carson City	4,720	82	92	25.31	30.10	– .03	38.0	+ 5.7	64	29	50	16	2	26	39	33	28	70	0.23	– 2.3	6	3,604	sw.	36	sw.	24	7	12	12	5.9	0.1
Winnemucca	4,344	18	56	25.68	30.15	– .01	34.4	+ 7.4	57	24	45	8	11	24	35	30	27	76	0.60	– 0.5	5	4,427	ne.	28	sw.	21	5	4	22	7.5	0.4
Modena	5,479	10	43	24.67	30.15	+ .05	30.7	+ 1.6	57	29	42	– 4	2	20	35	25	19	66	0.86	+ 0.2	5	5,672	w.	27	e.	1	9	15	7	5.2	9.0
Salt Lake City	4,366	105	110	25.72	30.19	+ .04	33.2	+ 5.3	57	25	44	22	12	26	21	30	25	71	0.65	– 0.8	8	2,736	se.	25	e.	11	12	6	13	5.1	4.1
Durango	6,546	18	56	23.70	30.33	......	24.9	......	48	25	36	– 2	14	14	33	22	19	82	2.69	......	9	3,582	nw.	24	se.	10	8	9	14	6.0	23.9
Grand Junction	4,608	43	51	25.55	30.27	+ .21	24.0	– 3.0	40	23	33	– 5	14	15	35	22	18	77	1.01	+ 0.4	4	2,225	nw.	17	se.	13	6	7	18	7.0	13.8
Northern Plateau.							**30.9**	**+ 6.0**										**84**	**1.27**	**+ 0.8**										**7.6**	
Baker City	3,471	53	59	26.85	30.24	+ .08	28.1	+ 5.3	47	26	33	4	12	23	20	27	24	83	1.47	– 0.2	14	3,593	se.	17	se.	18	2	12	17	7.5	7.7
Boise	2,739	61	68	27.32	30.26	+ .07	33.6	+ 6.2	56	24	40	14	11	27	21	31	28	82	1.50	– 0.8	12	2,137	w.	21	e.	23	3	7	21	8.0	5.0
Lewiston	757	10	51	29.37	30.21	+ .05	36.6	......	55	3	42	17	11	31	19	......	......	......	0.98	– 0.3	11	3,096	e.	33	nw.	3	5	7	19	7.2	0.3
Pocatello	4,483	46	54	25.58	30.24	+ .04	28.8	+ 9.7	54	25	36	1	10	21	26	26	23	79	0.37	– 1.6	6	4,750	w.	30	sw.	1	7	8	16	6.6	4.0
Spokane	1,929	101	110	28.13	30.25	+ .13	30.8	+ 6.3	46	3	36	12	8	26	16	29	27	84	1.99	– 0.6	15	3,250	ne.	24	s.	25	5	2	24	8.2	5.4
Walla Walla	1,000	71	79	29.12	30.23	+ .08	33.3	+ 4.8	55	27	38	14	12	29	19	32	31	91	1.29	– 1.1	13	2,844	s.	25	sw.	3	2	6	23	7.8	2.6
N. Pac. Coast Reg.							**41.3**	**+ 2.0**										**82**	**6.51**	**– 2.0**										**7.2**	
North Head	211	11	56	29.83	30.07	+ .02	43.2	+ 2.3	57	23	48	28	12	38	17	42	40	87	6.91	– 1.6	18	13,940	e.	70	se.	2	8	5	18	6.6	1.1
Port Crescent	259	12	29	29.80	30.09	+ .10	38.7	+ 3.2	52	24	43	21	12	34	19	......	......	......	7.65	+ 0.6	18	4,961	ne.	30	s.	25	5	9	17	7.0	14.0
Seattle	123	114	151	30.01	30.14	+ .09	40.8	0.0	53	27	45	28	11	36	14	39	36	83	5.61	+ 1.0	17	3,140	n.	42	sw.	25	7	6	18	6.9	4.1
Tacoma	213	113	120	29.87	30.10	+ .06	39.3	+ 1.3	52	24	44	20	12	34	17	......	......	......	4.93	– 1.5	18	3,668	sw.	34	sw.	25	6	10	15	7.0	7.5
Tatoosh Island	86	7	57	29.94	30.04	+ .06	43.4	+ 2.8	55	23	46	31	13	40	13	41	38	82	7.07	– 5.7	20	20,459	e.	83	e.	13	9	2	20	6.9	T.
Portland, Oreg.	153	68	96	29.95	30.12	+ .04	40.4	+ 2.0	58	27	45	25	12	36	16	37	33	76	3.66	– 3.5	17	4,637	nw.	37	sw.	25	4	7	20	7.5	2.5
Roseburg	518	56	60	29.52	30.08	– .02	43.0	+ 2.7	68	23	48	25	12	38	25	41	38	84	2.76	– 3.4	15	1,946	nw.	30	w.	25	0	13	18	8.2	0.0
Mid. Pac. Coast Reg.							**49.4**	**+ 2.8**										**83**	**4.91**	**– 0.3**										**6.8**	
Eureka	62	62	80	29.99	30.06	– .04	51.0	+ 5.0	65	23	56	37	9	46	22	48	44	77	4.81	– 2.8	15	5,485	se.	37	se.	13	3	16	12	6.5	0.0
Mount Tamalpais	2,375	11	18	27.59	30.09	– .02	46.3	......	60	29	51	34	5	42	20	43	40	82	4.49	......	15	13,990	se.	64	nw.	11	6	7	18	6.7	0.0
Red Bluff	332	50	56	29.75	30.11	– .01	48.0	+ 3.1	63	28	55	31	2	41	25	45	42	83	7.45	+ 2.8	13	3,858	n.	26	se.	22	8	4	19	6.9	0.0
Sacramento	69	106	117	30.03	30.11	– .01	47.6	+ 2.0	61	23	53	30	4	42	21	46	44	87	3.33	– 0.5	13	4,825	se.	37	se.	21	4	7	20	7.8	0.0
San Francisco	155	161	167	29.96	30.13	+ .02	51.2	+ 1.1	63	27	56	40	6	46	15	49	47	84	4.04	– 0.7	10	4,401	n.	30	se.	13	9	8	14	6.2	0.0
Southeast Farallon	30	9	17	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
S. Pac. Coast Reg.							**55.2**	**+ 4.6**										**74**	**2.00**	**– 0.8**										**6.1**	
Fresno	330	67	70	29.75	30.12	+ .02	49.2	+ 4.7	67	14	56	30	2	42	27	46	44	84	0.93	– 0.4	5	2,896	se.	18	s.	20	2	8	21	8.0	
Los Angeles	338	116	123	29.70	30.08	.00	59.0	+ 5.9	81	29	69	42	2	49	34	51	44	65	2.57	– 0.4	4	3,497	ne.	21	sw.	10	9	13	9	5.3	
San Diego	87	94	102	29.95	30.04	– .03	58.1	+ 4.5	73	14	66	46	1	51	25	52	48	74	2.16	+ 0.1	6	3,693	nw.	27	se.	9	18	3	10	4.5	
San Luis Obispo	201	47	54	29.87	30.09	.00	54.5	+ 3.4	76	29	64	35	2	45	37	49	45	75	2.35	– 2.3	10	3,336	n.	24	n.	4	4	13	14	6.5	
West Indies.																															
Grand Turk	11	6	20	30.05	30.06	+ .03	71.8	......	77	7	75	65	29	69	9	......	......	......	3.30	......	12	......	......	......	......	......	13	11	7	5.4	
Havana	57	87	105	30.08	30.14	+ .09	67.1	– 3.2	83	12	73	51	27	62	22	......	......	......	1.20	– 1.5	10	9,791	e.	39	nw.	13	10	8	13	5.8	
San Juan	82	48	90	29.94	30.03	+ .01	75.4	+ 0.1	86	26	81	66	17	70	18	70	67	80	3.95	+ 1.0	18	7,983	e.	35	e.	10	10	16	5	4.4	

* More than one date.

TABLE II.—*Climatological record of voluntary and other cooperating observers, January, 1905.*

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Alabama.					
Alaga				4.63	
Anniston	64	4	33.6	6.42	0.2
Ashville	66	5	36.6	6.94	
Benton				5.03	
Bermuda	72	13	43.9	4.98	
Boligee	72	13	41.1	6.65	
Bridgeport				3.20	0.3
Burkeville				5.95	
Calera				5.95	
Camphill	72	11	40.6	3.47	
Cedar Bluff				3.88	T.
Citronelle	74	15	46.8	6.62	
Cordova	70	9	37.1	5.73	
Dadeville				4.52	
Daphne	77	17	47.6	4.10	
Decatur	65	5	35.4	3.29	1.5
Delmar	66	3	35.6	4.80	1.0
Demopolis				7.28	
Eufaula	68	13	41.2	3.34	
Flomaton	70	16	45.2	4.02	
Florence *a*				5.28	2.0
Florence *b*	68	3	34.6	5.28	2.0
Fort Deposit	70	13	42.0	3.31	
Gadsden	68	7	35.5	6.16	
Goodwater	66	7	35.4	7.32	
Greensboro	68	11	40.4	6.98	
Greenville				6.20	
Guntersville				4.51	0.1
Hamilton	67	6	35.6	5.02	
Highland Home	70	11	39.8		
Letohatchie				3.38	
Livingston	69	14	38.9	6.04	
Lock No. 4	66	9	39.3	7.15	
Lucy	77	14	47.8	4.26	
Madison Station	67	2[a]	35.6[b]	3.21	0.5
Maplegrove	66	6	34.6	4.28	0.5
Marion	68	12	39.4	6.99	
Milstead				4.10	
Newbern	68	11	39.8	7.55	
Notasulga				3.27	
Oneonta	65	4	34.7	5.60	0.5
Opelika	63	15	39.9	4.42	
Ozark	68	19	44.3	6.48	
Prattville	70	10	42.0	4.92	
Riverton	69	3	35.2	6.02	4.3
Scottsboro	69	4	34.4	3.88	1.0
Selma	71	14	40.5	6.93	
Spring Hill	67	16	45.6	6.17	
Talladega	70	8	39.4	6.45	
Tallassee				4.15	
Tuscaloosa	67	11	37.0	5.45	
Tuscumbia	63	4	34.4	5.63	T.
Tuskegee	72[c]	12[c]	43.8[c]	4.18	
Union Springs	68	10	40.4	4.70	
Uniontown	69	8	39.8	7.70	
Valleyhead	68	1	34.6	3.78	T.
Verbena				5.06	
Vienna				5.42	
Wetumpka	73	12	42.8	5.27	
Alaska.					
Fort Liscum	43	5	23.4	3.63	37.5
Junea	47	13	31.0	2.83	
Killisnoo	43	12	29.1	1.90	10.5
Loring	41	7	28.4	5.18	7.0
Orca	45	21	31.2	8.20	
Sitka	55	22	34.8	3.82	8.0
Skagway	39	2	24.2		
Sunrise	44	−7	17.9	2.12	24.2
Tanana		−45		0.24	2.5
Teikhill	34	−26	0.2	0.98	10.0
Arizona.					
Allaire Ranch				2.21	
Alpine				3.15	18.0
Arizona Canal Co. Dam	79	38	56.5	3.24	
Aztec	81	33	57.0	1.15	
Benson	77	22	48.6	1.08	
Bisbee	67	31	47.2	1.12	
Blue	59	18	38.0	3.31	11.5
Bowie	93	11	54.2	1.91	
Buckeye	80	25	52.6	2.91	
Casagrande	82	30	54.4	2.76	
Champie Camp	87	24	51.3	7.60	
Cochise*[1]	68	26	45.0	2.18	
Congress	73	38	53.2	4.64	
Douglas	76	22	48.7	0.80	
Dragoon*[1]	63	28	44.2		
Dudleyville	79	27	52.1	3.57	
Duncan	70	15	43.4	2.10	
Fort Apache	68	12	41.0	3.45	
Fort Defiance	48	−5	24.6	2.20	22.0
Fort Grant	73	29	48.4	0.36	
Fort Huachuca	74	29	48.2	4.65	
Fort Mohave	74	22	50.4	1.43	
Gilabend	80	33	58.4	1.30	
Grand Canyon	51	12	31.2	1.50	15.0
Greaterville	71	28	47.6	3.38	
Greer				1.65	17.5
Holbrook	63	11	35.6	1.29	T.
Arizona—Cont'd.					
Jerome	65	33	44.8	5.10	
Kingman	69	26	45.8	1.77	12.0
Maricopa	75	25	52.4	1.60	
Mesa	84[c]	30[c]	55.4[c]	2.85	
Mohawk Summit*[1]	75	48	57.8	0.10	
Natural Bridge				6.31	2.0
Oracle	66	34	49.6	3.99	
Oro				3.61	
Parker	81	19	53.3	1.55	
Phoenix	79	28	53.8	3.58	
Picacho*[1]	81	39	55.4		
Pinal Ranch				9.00	
Prescott	67	12	39.1	4.74	
San Carlos	76	24	49.2	3.46	T.
San Simon	82	19	49.0	1.63	
Seligman	78	18	40.1	1.97	1.5
Sentinel*[1]	79	35	54.8		
Superstition				5.63	
Taylor	68	10	34.0	1.68	
Tempe	76	26	51.9	2.62	
Thatcher	72	22	48.2	1.66	
Tombstone	68	30	48.2	1.96	
Tuba	51	4	27.4	1.45	3.0
Tucson	67	26	48.7	2.25	
Upper San Pedro	80	21	48.2	0.25	
Vail*[5]	72	41	55.8	1.90	
Walnut Grove				4.15	
Wilcox	70	18	44.5	2.56	
Williams	60	12	37.2	4.69	30.0
Yarnell				6.65	
Young	71	11	41.0	5.21	
Arkansas.					
Amity	73	10	38.2	4.57	5.0
Arkadelphia	69	11	36.9	4.80	T.
Arkansas City				7.00	
Batesville	64	0	30.6	3.82	6.5
Beebranch	65	0	32.6		7.5
Black Rock				5.33	6.0
Blanchard Springs	70	10	37.6	5.30	
Brinkley	69	5	34.2	4.21	2.0
Calico Rock				4.05	4.5
Camden *a*				5.80	
Clarendon				5.10	
Corning	64	−2	27.8	3.64	7.0
Dallas	63	6	36.2	3.78	1.0
Dardanelle				1.86	7.0
Des Arc	67	4	34.4	4.47	5.0
Dodd City	64	−7	27.2	1.32	10.2
Dutton	58	−8	28.4	4.76	7.0
Eldorado	70	12	38.0	5.18	
Elon	71[d]	11[d]	39.0[d]	8.08	
Eureka Springs	65	−7	29.0	3.32	5.0
Fayetteville	61[c]	−8[b]	27.2[c]	3.05	0.9
Forrest City	66	3	31.8	4.83	
Fulton				5.56	
Hardy	65	−5	29.4	4.35	7.8
Heber	66	−1	32.6	3.84	6.2
Helena *a*				6.22	
Helena *b*	69	6	35.3	6.31	6.1
Hope	70	13	39.2	4.10	
Howe	68	12	38.8	4.51	T.
Jonesboro	67	−1	33.4		
Lacrosse	57	−5	28.0	2.40	8.5
Lake Village	67	10	36.4	8.69	T.
Lonoke	67	5	34.8	3.95	1.5
Lutherville	63	−2	32.2	3.79	8.0
Luxora				2.40	5.0
Malvern	69	10	35.2	5.72	
Mammoth Springs	58	−8	26.8	4.16	13.0
Marked Tree				3.29	6.0
Marvell	67	6	35.4	5.91	T.
Mossville	58	−8	28.0	4.93	5.5
Mount Nebo	58	−2	32.3	4.38	5.0
New Lewisville	70	14	38.8	4.38	
Newport *a*				3.08	0.6
Newport *b*	67	1	31.0		
Oregon	64	−9	27.0	3.27	7.0
Osceola	69		34.2[d]	3.87	10.5
Perry	64	6	34.4	4.28	6.0
Pinebluff	58	9	34.6	7.17	
Pocahontas	65	1	29.7		
Pond	66	−13	27.4	2.60	4.0
Prescott	70	12	37.4	5.38	
Princeton	68	10	37.2	5.88	
Russellville	57	2	28.5	3.82	7.2
Silversprings	66	−8	29.0	3.08	7.0
Spielerville	68	4	32.8	4.17	10.5
Springbank				3.11	
Stuttgart	68	7	34.8	5.65	T.
Texarkana	69	13	39.6	3.84	
Warren	70	11	36.5	6.51	
White Cliffs				3.30	
Wiggs	67	6	35.0	4.17	1.3
Winchester	69	11	37.0	6.55	
Witts Springs	54[f]	−7	26.3[d]	5.27	7.2
California.					
Alturas				0.97	0.5
Auburn	65	31	47.8	3.50	
California—Cont'd.					
Azusa	84	37	57.0	3.65	
Bagdad	75	33	54.4	2.40	
Bakersfield				1.11	
Barstow	70	41	55.1	1.10	
Bear Valley				8.01	10.0
Berkeley	63	34	48.7	5.58	
Bishop	75	15	43.0	0.46	
Blue Canyon	61	19	41.0	6.24	5.0
Bodie	58	−16	27.4	0.10	1.0
Bowman				11.47	31.5
Branscomb	68	25	45.6	14.14	
Brush Creek	58	26	43.6	12.45	
Butte Valley				13.05	47.0
Calexico	73	33	54.2	1.50	
Cambria				4.02	
Campbell	66	30	49.1	2.73	
Campo				4.32	
Cedarville	56	12	34.8	0.46	T.
Chico	64	32	48.8	7.14	
Claremont	81	37	57.8	3.24	
Cloverdale	68	29	49.0	10.29	
Colfax	72	30	48.4	5.36	
Colusa	60	32	47.2	4.25	
Craftonville				5.53	
Crescent City	62	30	49.2	11.82	
Crockers				3.62	
Cuyamaca	59	19	39.5	9.87	1.0
Delta	70	27	49.4	14.39	2.0
Dobbins	68	33	50.6	5.87	
Drytown	64	28	47.4	3.05	
Durham	65	27	47.2	6.20	
Elcajon	79	34	55.5	2.67	
Electra	62	30	47.8	2.18	
Elmdale	74	31	51.3	2.94	
Elsinore	78	28	53.1	5.32	
Escondido	75	25	49.8	3.97	
Folsom	66	30	48.5	3.24	
Fordyce Dam				5.90	40.0
Fort Bragg				8.42	
Fort Ross	64	35	49.8	14.68	
Foster				5.89	
Georgetown	64	27	47.0	5.31	
Gilroy (near)	70	27	51.6	3.11	
Greenville	56	11	36.5	4.70	T.
Hanford	70	27	49.0	1.28	
Healdsburg	71	21	49.0	13.03	
Hollister	68	29	50.6	2.75	
Idylwild	68	20	43.6	6.85	5.5
Iowa Hill	66	29	47.8	4.78	
Isabella	69	24	48.0	0.92	
Jamestown	68	28	47.3	2.48	
Jolon				2.61	
Kennedy Gold Mine				3.35	
Kentfield				8.77	
King City	72	30	51.4	1.68	
Le Grand	68	27	46.4	2.05	
Lemoncove	72	30	51.8	0.84	
Lick Observatory	60	26	43.4	4.04	
Livermore	69	29	49.0	2.43	
Lodi	66	29	48.2	3.49	
Lone Pine	66	16	41.8	0.60	
Los Gatos	64	35	50.0	4.98	
Lowe Observatory				4.02	
Magalia	67	28	46.0	14.26	
Mammoth	76	37	57.1	0.13	
Marysville	64	29	47.8	4.33	
Meadow Vallew				11.22	14.0
Merced	69	29	49.4	1.30	
Mercury				14.26	
Mills College				4.84	
Milo				2.56	
Milton (near)	64	34	49.4	2.43	
Mohave	68	30	48.6	0.70	
Mokelumne Hill				3.73	
Montague	60	16	39.4	1.76	
Monterio	72	30	48.6	1.27	
Mount St. Helena				17.02	
Napa	65	31	49.3	4.40	
Needles	73	40	56.8	0.95	
Nellie				11.46	1.5
Nevada City	67	23	45.6	7.33	
Newcastle	63	34	51.4	4.03	
Newman	65	29	48.0	3.00	
Niles	64	34	50.4	3.43	
Nordhoff	82	26	47.8	3.12	
North Bloomfield	65	23	43.7	6.48	2.0
Oakland	65	36	51.1	4.91	
Ontario (near)	77	35	54.5	3.26	
Orland	66	30	47.6	7.67	
Orleans	70	27	49.4	7.00	
Oroville (near)	67	30	48.2	4.01	
Palermo	64	27	47.5	4.75	
Peachland	67	28	48.0	9.50	
Pilot Creek				6.19	T.
Pine Crest	75	44	57.1	4.16	
Placerville	60	26	44.2	3.27	
Point Lobos	67	46	55.8	3.92	
Point Reyes Light	64	43	52.4	3.87	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Porterville	72	30	51.2	0.73	
Poway	76	33	56.2	4.25	
Quincy	54	21	38.8	6.16	T.
Redding	63	30	47.6	10.90	
Reedley	74	31	52.0	1.27	
Represa	.....	.....	.....	3.34	
Riovista	62	30	47.2	2.85	
Riverside	87	31	55.8	3.07	
Rohnerville	.....	.....	.....	6.22	
Sacramento	65	30	47.8	4.49	
Salinas	72	35	53.1	2.85	
Salton	79	27	57.2	1.80	
San Bernardino	85	31	55.4	3.92	
San Jacinto	.....	.....	.....	3.46	
San Jose	70	32	51.4	2.70	
San Rafael	63	32	49.2	8.61	
Santa Barbara	78	42	56.6	3.73	
Santa Clara College	68	29	50.2	2.42	
Santa Cruz	71	30	50.6	6.95	
Santa Maria	78	39	55.3	1.85	
Santa Monica	.....	.....	.....	1.91	
Santa Rosa	66	28	48.0	5.53	
Sausalito	.....	.....	.....	4.60	
Shasta	65	27	47.0	15.15	
Sierra Madre	85	43	57.2	3.00	
Sisson	51	16	36.9	10.29	5.0
Snedden	.....	.....	.....	1.75	
Sonoma	69	32	49.4	5.21	
Sonora	58	29	46.4	2.36	
Southeast Farallon	60	46	53.5	3.20	
Stockton	61	29	46.8	3.11	
Storey	65	30	46.9	1.30	
Summerdale	66	20	42.0	3.38	4.0
Summit	46	14	30.8	5.55	50.0
Susanville	55	9	33.6	0.97	
Tejon Ranch	79	32	51.8	1.01	
Truckee	54	− 6	26.3	2.59	14.0
Tulare	76	30	50.6	1.21	
Tustin	.....	.....	.....	2.38	
Ukiah	65	25	47.0	9.29	
Upland	74	36	52.0	.....	
Upperlake	66	19	43.6	7.62	
Upper Mattole	.....	.....	.....	23.55	
Vacaville	65	28	47.2	7.10	
Visalia	73	27	49.4	1.03	
Volcano	80	26	55.0	1.70	
Wasco	70	30	49.2	1.12	
Weldon	.....	.....	.....	1.06	
Westpoint	.....	.....	.....	2.96	
West Saticoy	.....	.....	.....	3.35	
Wheatland	62	29	47.0	4.46	
Willets	.....	.....	.....	11.40	
Willows	68	38	50.7	6.20	
Yosemite	60	20	38.0	1.81	T.
Yreka	.....	.....	.....	2.16	
Zenia	62	25	44.6	11.81	
Colorado.					
Akron	.....	.....	.....	0.37	6.5
Alford	56	−20	24.6	0.43	8.5
Antelope Springs	41	−28	15.5	0.90	14.0
Ashcroft	42	−12	19.6	1.25	19.5
Blaine	62	−16	27.0	0.47	7.0
Boulder	62	−11	29.4	0.81	13.5
Boxelder	.....	.....	.....	0.50	6.0
Breckenridge	46	−12	20.2	1.82	28.0
Burlington	63	−17	25.6	0.33	2.5
Canyon	62	−17	30.5	0.67	5.8
Cedaredge	60	− 2	25.0	1.52	17.3
Cheesman	62	−13	27.4	0.77	8.5
Cheyenne Wells	69	−14	27.2	0.14	2.0
Collbran	45	−13	22.8	1.37	18.0
Colorado Springs	58	− 7	28.3	0.15	T.
Conejos	44	−16	16.8	1.55	17.8
Cripplecreek	.....	.....	.....	0.65	10.2
Eagle	51	−14	23.5	0.93	11.0
Fort Collins	64	−22	25.3	0.29	2.8
Fort Morgan	57	−27	24.2	0.38	7.1
Fowler	.....	.....	.....	0.11	1.5
Fox	61	−16	25.8	0.25	6.2
Fruita	42	−16	22.7	0.85	7.5
Garnett	37	−28	10.4	0.40	6.5
Gleneyre	62	−12	27.4	0.32	2.2
Grand Valley	43	− 7	25.0	0.43	5.6
Greeley	63	−21	26.5	0.17	2.8
Grover	.....	.....	.....	0.10	3.0
Gunnison	45	−30	14.8	0.94	13.8
Halls Gulch	43	0	17.6	2.17	33.0
Hamps	60	−13	25.8	0.08	1.5
Hoehne	63	−25	27.4	0.55	3.5
Holly	58	−16	27.4	0.28	3.0
Holyoke (near)	58	−27	23.0	0.20	4.0
Husted	58	−17	24.8	0.19	3.2
Lake Moraine	45	4	24.4	1.55	21.0
Lamar	61	−14	28.5	0.26	4.0
Laporte	.....	.....	.....	0.40	6.8
Lay	47	−26	19.5	0.62	14.0
Leadville	44	− 4	21.8	0.82	9.0
Leroy	59	−15	23.9	0.17	2.8

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Longs Peak	42	−13	21.5	1.87	18.5
Mancos	52	− 4	27.8	2.44	27.0
Marshall Pass	.....	.....	.....	3.01	48.0
Meeker	48	−19	23.0	0.93	14.0
Montrose	44	− 7	24.4	1.39	15.0
Pagoda	53	−14	25.4	0.99	18.0
Platte Canyon	.....	.....	.....	1.40	8.5
Rockyford	64	−13	27.3	0.05	2.0
Saguache	40	−10	15.8	0.13	2.0
Salida	55	−10	27.7	2.06	19.0
San Luis	45	−20	17.4	1.46	19.0
Santa Clara	54[c]	− 6[c]	26.0[c]	3.21	37.0
Sheridan Lake	60	−15	26.0	0.05	1.2
Silt	43	2	25.2	1.14	15.5
Silverton	47	−23	20.4	1.32	27.4
Sugar City	.....	.....	.....	0.08	2.8
Sugar Loaf	49	−14	24.8	0.97	15.0
Trinidad	76	2	35.3	0.74	8.0
Victor	42	− 7	23.4	0.79	12.0
Vilas	.....	.....	.....	0.69	9.0
Wagon Wheel	49	−26	16.8	0.52	8.0
Walden	40	−18	20.8	0.35	6.0
Waterdale	49	−16	22.1	0.32	3.5
Westcliffe	58	−11	22.7	2.22	32.0
Whitepine	41	− 9	18.2	1.41	21.0
Wray	62	−23	26.1	.....	.....
Yuma	.....	.....	.....	0.31	4.5
Connecticut.					
Bridgeport	53	− 1	25.2	4.68	20.7
Canton	50	−17	19.6	6.69	29.5
Colchester	50	− 1	23.8	3.89	18.0
Falls Village	.....	.....	.....	4.82	31.2
Hawleyville	48	− 5	22.2	6.48	27.5
New London	51	1	25.8	3.74	15.5
North Grosvenor Dale	51	− 8	20.8	2.93	.....
Norwalk	51	− 8	22.7	4.78	19.8
Southington	51	−10	22.2	4.25	18.5
South Manchester	.....	.....	.....	5.42	31.0
Storrs	49	− 1	22.2	3.57	.....
Voluntown	53	− 8	24.3	2.89	9.5
Wallingford	.....	.....	.....	5.54	29.0
Waterbury	50	− 6	22.3	6.51	37.5
West Cornwall	48	− 8	19.8	6.91	52.2
West Simsbury	.....	.....	.....	6.70	39.0
Delaware.					
Delaware City	.....	.....	.....	3.25	16.6
Milford	61	− 3	30.8	4.51	24.5
Millsboro	63	− 6	30.0	4.27	18.2
Newark	58	0	27.4	4.21	16.4
District of Columbia.					
Distributing Reservoir*[b]	49	5	30.2	.....	.....
Receiving Reservoir*[b]	45	3	29.4	.....	.....
West Washington	69	− 2	29.4	3.85	13.8
Florida.					
Apalachicola	75	20	50.0	3.27	
Archer	78	21	51.6	1.04	
Avon Park	81	22	57.2	0.60	
Bartow	82	20	56.0	0.35	
Bonifay	75	16	48.0	6.52	
Brooksville	84	18	54.9	0.93	
Carrabelle	70	18	50.2	3.03	
Clermont	84	21	56.7	0.27	
De Funiak Springs	74	13	46.0	7.28	
Deland	81	18	52.6	.....	
Eustis	84	20	54.2	0.40	
Federal Point	82	19	51.8	1.04	
Fernandina	78	19	51.0	2.62	
Flamingo	82	30	63.6	T.	
Fort Meade	82	20	54.9	2.25	
Fort Pierce	81	24	58.6	0.60	
Gainesville	80	16	50.8	0.94	
Grasmere	78	22	53.7	.....	
Huntington	89	19	55.6	0.49	
Hypoluxo	82	26	61.8	2.29	
Inverness	81	16	50.6	0.75	
Jasper	77	16	47.6	2.27	
Johnstown	78[c]	16[c]	49.2[c]	2.25	
Kissimmee	78	20	54.4	0.70	
Lake City	76	16	48.9	2.40	
Macclenny	.....	.....	.....	2.07	
Madison	75	16	47.8	1.39	
Malabar	82	21	56.8	1.04	
Manatee	82	24	56.3	0.53	
Marco	81	30	60.2	0.63	
Marianna	77	15	47.2	5.11	
Merritt Island	77	24	57.4	0.44	
Miami	82	29	64.0	2.65	
Middleburg	84	12	49.0	1.72	
Molino	75	14	45.8	5.75	
Monticello	75	16	49.6	3.23	
Myers	79	27	58.2	0.50	
New Smyrna	85[c]	20[d]	55.0[d]	0.48	
Nocatee	82	23	57.4	0.22	
Ocala	84	17	52.4	1.01	
Orange City	84	17	53.6	0.41	
Orange Home	83	17	53.3	0.95	
Orlando	84	21	55.4	0.41	
Pinemount	78	16[i]	46.6[g]	2.53	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Plant City	82	15	54.4	T.	
Rockwell	80[1]	18[1]	51.8[1]	0.82	
St. Andrews	71	18	46.8	4.89	
St. Augustine	73	18	51.4	0.56	
St. Leo	84	20	54.6	0.51	
Sand Key	80	45	64.5	0.83	
Stephensville	78	16	48.8	2.31	
Sumner	79	13	49.6	0.89	
Switzerland	80	18	49.8	1.13	
Tallahassee	73	17	49.6	3.25	
Tarpon Springs	78	21	53.2	0.34	
Titusville	80	19	54.4	0.67	
Wausau	73	15	43.8	4.66	
Wewahitchka	75	17	47.2	3.37	
Georgia.					
Adairsville	61[c]	5[c]	36.4[c]	4.59	T.
Albany	71	18	44.1	4.11	
Allapaha	74	15	44.4	3.40	
Americus	66[c]	12[c]	42.4[c]	3.81	
Athens	63	9	37.0	2.75	T.
Bainbridge	72	15	43.4	4.31	
Blakely	75	14	45.0	3.28	
Butler	.....	.....	.....	2.65	T.
Camak	74	12	42.8	1.86	
Carrollton	68	6	36.4	4.31	
Clayton	67[f]	.....	37.2[f]	5.86	5.0
Columbus	69[c]	9[c]	40.0[c]	2.27	
Covington	71[c]	9[c]	39.8[c]	2.35	
Cuthbert	64	10	42.5	3.19	
Dawson	71	13	44.0	3.78	
Dudley	72	14	43.9	2.86	T.
Eastman	68	14	42.1	3.48	T.
Eatonton	.....	12[c]	40.4[d]	1.68	
Elberton	66	12	39.6	2.31	
Experiment	65	10	39.7	1.89	
Fleming	67	15	47.1	3.14	
Forsyth	72	11	41.6	1.83	
Fort Gaines	68	14	43.0	4.34	
Gainesville	60	7	34.8	4.28	2.5
Gillsville	67	8	38.8	3.84	0.3
Greenbush	62	3	34.0	4.02	0.5
Greensboro	69	11	38.6	1.43	
Griffin	65	10	37.2	2.11	
Harrison	72	9	42.6	1.98	
Lost Mountain	64	5	38.5	4.93	1.3
Louisville	66	13	42.8	2.09	
Lumpkin	74	10	43.3	3.65	
Marshallville	77	13	42.6	2.45	
Mauzy	70	15	46.4	3.60	
Millen	.....	14[c]	45.3[c]	1.70	
Monticello	69	11	39.6	1.97	
Morgan	67	15	41.6	5.49	
Newnan	66[c]	6[c]	36.8[c]	3.17	
Poulan	73	14	43.1	5.06	
Putnam	70	12	41.8	2.80	
Quitman	73	16	46.0	3.35	
Ramsey	61	5	36.2	5.28	0.5
Rome	63	6	36.0	5.73	T.
St. Marys	78	14	47.2	2.15	
Statesboro	71	14	46.0	2.25	
Talbotton	70	12	41.8	2.45	
Tallapoosa	59	2	36.0	3.15	
Thomasville	73	15	46.7	3.74	
Toccoa	68	6	35.8	4.47	2.7
Valona	72	16	46.6	1.67	
Washington	61	11	38.7	1.66	T.
Waycross	72	16	46.8	2.39	
Waynesboro	68	13	42.6	1.20	T.
Westpoint	70	11	37.0	3.10	
Woodbury	67	11	37.6	2.29	
Idaho.					
Albion	54	3	30.5	0.95	9.0
American Falls	54	− 4	26.6	0.33	.....
Blackfoot	51	− 1	26.6	0.30	3.0
Blue Lakes	61	8	33.8	0.92	0.5
Burnside	40	5	21.4	0.17	1.7
Caldwell	52	9	31.5	1.30	8.0
Cambridge	40[j]	− 7[j]	20.3[j]	2.63	
Chesterfield	48	−18	20.4	0.66	12.0
Dewey	50	−11	28.3	1.25	11.1
Ditto Creek	55	7	32.4	1.14	4.4
Forney	49	−14	22.6	0.76	7.2
Garnet	58	10	35.0	0.57	.....
Glens Ferry	.....	.....	.....	0.56	0.2
Grangeville	53	7	31.0	0.90	3.0
Idaho City	42	− 4	24.0	0.99	.....
Idaho Falls	49	− 5	24.8	0.54	4.8
Lake	40	−28	13.6	0.40	4.0
Lakeview	48	4	29.9	2.20	9.0
Landore	.....	.....	.....	2.26	19.6
Lost River	52	− 6	21.6	T.	T.
Lovell	54	11	33.2	3.73	8.0
Milner	56	3	29.9	0.16	2.5
Moscow	51	7	32.2	0.78	3.1
Murray	42	− 4	26.9	2.46	8.0
Oakley	55	4	31.2	0.20	2.0
Ola	49	− 3	28.8	1.43	7.3
Paris	46	− 6	23.3	1.09	13.7

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Idaho—Cont'd.					
Payette	50	9	30.6	1.49	9.0
Pollock	56	15	36.6	0.31	
Poplar				1.23	.....
Porthill	49	0	28.2	2.65	16.0
Priest River	40	− 5	25.8	2.80	.....
Roosevelt	43	−11	21.6	0.78	13.0
St. Maries	48	4	31.2	1.95	4.0
Vernon	44	1	24.4	0.40	4.0
Weston	51	− 6	25.8	0.86	7.0
Illinois.					
Albion	60	− 6	24.9	2.70	5.0
Aledo	51	−11	16.5	0.58	5.5
Alexander	63	− 8	21.0	2.67	6.2
Antioch	43	−12	13.6	1.00	10.0
Ashton	48	−11	15.0	0.80	4.9
Astoria	57	− 9	18.9	1.61	12.5
Aurora	50	−10	17.5	0.93	9.3
Benton	65	− 6	27.6	1.03	7.2
Bloomington	54	− 8	19.7	1.37	6.0
Bushnell	57	− 8	18.8	0.85	8.5
Cambridge	50	−10	16.0	0.95	8.5
Carlinville	64	− 9	22.7	2.39	4.0
Carrollton	66	− 8	22.5	2.20	1.5
Charleston	60	− 8	22.9	1.82	7.5
Chester	.....	.....	.....	3.05	16.8
Cisne	67	− 5	26.6	1.99	5.0
Coatsburg	60	−11	19.0	1.19	1.0
Cobden	66	− 5	26.8	3.45	4.5
Colchester	58	−10	19.4	1.16	.....
Danville a	59	− 6	23.5	.....	.....
Decatur	62	− 8	21.5	2.02	5.3
Dixon	.....	.....	.....	0.32	.....
Effingham	64	− 7	24.3	2.10	4.7
Equality	65	− 5	27.0	2.77	9.5
Flora	61	− 8	23.8	1.45	4.0
Friendgrove	59	− 5	25.8	2.11	11.9
Galva	49	−12	13.5	0.67	6.1
Greenville	65	− 7	23.4	1.95	7.5
Griggsville	64	− 8	22.6	1.60	.....
Halfway	62	− 6	27.1	2.75	7.0
Havana	57	−10	19.6	1.60	5.8
Henry	50	−12	18.0	1.09	7.5
Hillsboro	64	− 7[d]	24.5	2.98	8.5
Hoopeston	52	−10	21.0	1.76	7.0
Joliet	61	− 6	19.0	1.18	10.3
Kishwaukee	45	−12	14.4	0.61	4.1
Knoxville	54	−13	16.8	1.07	4.8
Lagrange	47	− 8	17.2	0.72	5.5
Laharpe	55	−10	17.9	1.13	7.5
Lanark	44	−15	13.4	0.57	2.7
Loami	.....	.....	.....	2.09	3.5
McLeansboro	62	− 5	25.8	2.61	5.2
Martinton	51	−12	19.5	0.81	5.4
Mascoutah	60	− 6	22.1	3.37	9.9
Mattoon	64	− 6	26.8	1.20	5.8
Minonk	50	−13	17.8	1.16	5.0
Monmouth	51	−12	16.4	0.83	8.3
Morrison	49	−12	15.1	0.94	9.0
Morrisonville	61	− 8	22.0	2.26	6.0
Mount Pulaski	61	− 8	21.2	2.06	3.9
Mount Vernon	57	− 8	25.5	2.42	10.0
New Burnside	63	− 7	26.2	2.61	6.0
Olney	60	− 5	25.6	2.89	14.6
Ottawa	50[d]	− 7	18.8[h]	1.30	13.4
Palestine	60	− 8	25.3	2.00	7.0
Pana	61	− 7	22.8	2.16	4.5
Paris	57	− 6	22.7	1.26	.....
Peoria b	55	− 5	21.8	1.15	10.5
Philo	60	−12	20.2	2.18	3.7
Plumhill	60	− 6	25.2	1.72	8.0
Pontiac	51	− 8	19.3	1.80	9.5
Princeville	52	−11	17.6	0.35	4.5
Rantoul	57	− 9	21.0	1.85	6.3
Raum	65	− 8	26.4	3.71	8.3
Riley	44	−12	14.8	0.82	5.0
Robinson	60	− 7	24.9	1.87	6.0
Rushville	62	− 9	20.5	0.51	5.5
St. Charles	48	−10	16.6	0.99	9.8
St. John	64	− 5	26.6	2.51	4.0
Shobonier	68	− 6	24.3	1.05	10.0
Streator	49	−12	17.3	1.07	.....
Sullivan	65	− 9	22.0	2.28	6.8
Sycamore	46	−11	14.4	0.50	4.5
Tilden	64	− 6	25.2	2.61	7.5
Tiskilwa	48	−10	16.4	0.84	5.0
Tuscola	62	−10	19.8	2.37	6.2
Urbana	58	−11	19.2	1.80	6.5
Walnut	50[e]	−10[e]	16.0[e]	0.74	5.1
Warsaw	.....	.....	.....	0.60	3.0
Winchester	50	− 7	20.5	1.57	4.2
Windsor	64	−14	22.0	2.00	8.8
Winnebago	42	−13	13.2	0.66	7.2
Yorkville	50	−10	16.6	0.63	6.6
Zion	43	−13	12.6	0.70	7.0
Indiana.					
Anderson	55	− 6	22.8	1.52	5.6
Angola	51	− 7	20.2	2.15	13.4
Auburn	55	− 7	19.8	2.40	.....
Indiana—Cont'd.					
Bedford	52[e]	− 5[e]	25.7[e]	.....	.....
Bloomington	68	− 5	23.1	3.05	12.0
Bluffton	59	−10	20.2	1.45	6.5
Butlerville	60	− 4	24.6	2.73	11.7
Cambridge City	56	−13	20.8	1.71	4.7
Columbus	66	−11	24.6	1.72	6.0
Connersville	59	− 9	23.0	1.79	3.7
Crawfordsville	55	− 7	22.3	.....	
Delphi	53	−12	19.0	2.56	10.8
Farmersburg	61	− 6	25.4	1.70	7.0
Farmland	54	− 6	24.3	1.31	7.0
Fort Wayne	54	− 8	22.0	2.13	11.2
Franklin	62	−12	24.4	1.90	6.4
Greencastle	55	− 7	22.4	1.60	10.4
Greenfield	58	− 9	24.0	1.71	2.3
Greensburg	60	−10	24.2	2.10	9.5
Hammond	49	−12	19.8	1.85	15.0
Hector	55	− 7	21.6	1.80	8.0
Holland	65	− 5	27.7	3.80	7.8
Huntington	56	− 6	19.4	2.45	11.0
Jeffersonville	60	− 2	27.8	2.31	8.5
Kokomo	55	−12	20.2	1.60	2.5
Lafayette	54	− 8	19.6	2.92	9.9
Laporte	45	− 5	20.0	2.09	16.0
Logansport	52	− 7	20.2	1.25	.....
Madison a	60	− 2	26.8	2.47	4.2
Madison b	.....	.....	.....	2.66	.....
Marengo	61	− 4	26.2	3.80	8.5
Marion	55	− 9	22.0	2.49	12.8
Markle	56	−10	21.8	1.80	8.0
Mauzy	59	−14	22.2	2.25	9.8
Moores Hill	59	− 6	24.2	2.12	9.7
Mount Vernon	74	− 7	25.0	3.75	9.2
Northfield	54	−16	20.5	1.21	6.0
Paoli	62	− 7	24.9	2.57	8.0
Princeton	62	− 5	25.0	2.50	18.0
Rensselaer	47	−10	19.9	2.10	10.8
Richmond	55	−15	22.6	1.54	3.1
Rochester	52	−10	20.8	1.84	7.8
Rockville	56	− 9	22.0	1.62	4.0
Rome	68	− 6	27.9	3.89	16.6
Salem	65	− 7	26.1	2.48	13.2
Scottsburg	62	− 4	27.6	2.49	9.0
Seymour	60	0	28.1	1.90	9.5
Shelbyville	58	−12	23.4	2.14	5.3
South Bend	.....	.....	.....	2.85	16.5
Syracuse	52	− 8	20.0	2.28	15.5
Terre Haute	.....	.....	.....	2.45	6.9
Topeka	58	−10	20.4	1.50	15.0
Valparaiso	48	− 7	19.8	1.58	.....
Veedersburg	.....	.....	.....	1.63	2.8
Vevay	63	− 2	27.6	3.70	17.0
Vincennes	62	− 5	25.0	2.09	7.0
Washington	62	− 5	25.3	2.27	6.9
Winamac	51	−11	20.4	.....	
Worthington	60	− 5	28.6	1.72	7.0
Indian Territory.					
Ardmore	71	7	37.0	1.59	
Calvin	.....	.....	.....	2.46	3.0
Chickasha	67	− 2	32.2	1.50	1.5
Durant	70	7	33.5	2.62	
Fairland	69	− 6	28.0	2.99	4.0
Fort Gibson	.....	.....	.....	2.87	4.0
Goodwater	66	9	36.6	4.51	T.
Hartshorne	64	12	33.0	2.98	
Healdton	71	2	33.2	1.77	T.
Holdenville	71	4	33.2	2.48	T.
Marlow	63	0	30.6	2.63	
Muskogee	64	− 1	31.0	2.96	2.0
Okmulgee	68	2	30.9	2.04	1.6
Pauls Valley	72	− 1	31.5	1.05	
Ravia	72	7	35.6	1.99	
South McAlister	65	4	35.2	3.71	T.
Tahlequah	.....	.....	.....	0.75	T.
Tulsa	64[f]	0	28.4[f]	3.14	8.5
Vinita	66	− 8	27.2	2.43	6.0
Wagoner	52[f]	− 2[f]	27.6[f]	3.66	2.0
Webbers Falls	64	− 1	29.8	1.65	1.0
Iowa.					
Afton	48	−17	14.5	1.35	13.5
Albia	49	−14	12.3	1.04	11.5
Algona	39	−20	8.0	1.03	16.0
Allerton	48	−15	15.2	1.01	10.1
Alta	44	−26	7.9	1.27	13.7
Amana	45	−15	12.0	0.89	7.0
Ames	47	−18	14.5	0.64	7.1
Atlantic	46	−26	11.8	1.55	15.5
Audubon	44	−24	9.1	1.08	10.8
Baxter	44	−17	10.4	1.40	14.0
Bedford	50	−19	14.2	0.95	.....
Belleplaine	45	−18	10.2	1.65	16.5
Bonaparte	51	−11	16.2	0.79	7.5
Boone	44	−16	12.2	0.90	14.5
Britt	39	−21	7.2	1.14	11.8
Buckingham	.....	.....	.....	0.91	10.5
Burlington	54	−10	18.2	1.00	.....
Carroll	46	−20	10.6	1.57	15.5
Cedar Rapids	44	−12	10.6	0.74	13.1
Iowa—Cont'd.					
Chariton	47	−15	13.5	1.15	10.0
Clarinda	46	−19	12.8	0.87	11.2
Clearlake	41	−20	7.6	0.30	3.0
Clinton	48	−10	14.8	0.69	7.2
College Springs	47	−20	15.4	0.90	9.0
Columbus Junction	51	−11	16.4	0.78	10.2
Corning	45	−19	12.8	0.97	9.8
Corydon	48	−15	15.4	1.10	8.0
Cresco	39	−17	7.2	0.60	6.7
Cumberland	.....	.....	.....	1.00	10.0
Decorah	34	−20	6.6	0.91	9.0
Delaware	42	−15	9.0	0.74	8.5
Denison	46	−24	11.0	1.12	11.2
Desoto	43	−19	12.7	1.20	12.0
Dows	40	−19	7.2	1.10	12.0
Earlham	44[e]	−17[e]	12.7[e]	0.91	11.0
Elkader	38	−21	10.2	0.81	9.5
Estherville	42	−21	6.6	0.78	11.0
Fayette	38[g]	−24[f]	4.2[g]	.....	.....
Florence	.....	.....	.....	0.73	11.5
Forest City	40	−19	6.4	0.80	8.0
Fort Dodge	41	−18	8.4	0.80	8.0
Fort Madison	.....	.....	.....	1.37	10.5
Galva	45	−27	8.8	1.53	16.8
Gilman	.....	.....	.....	1.60	16.0
Glenwood	54	−20	15.0	0.75	7.5
Grand Meadow	38	−18	7.8	0.88	8.8
Greene	37	−18	8.3	0.69	8.0
Greenfield	45	−20	12.4	0.93	11.5
Grinnell	45	−15	11.3	.....	.....
Grundy Center	38	−17	8.8	1.50	15.0
Guthrie Center	48	−20	12.8	0.74	.....
Hampton	41	−17	8.8	0.69	11.7
Hanlontown	39	−21	6.8	1.00	10.0
Harlan	43	−24	10.8	0.87	10.5
Hopeville	46	−16	13.4	0.46	.....
Humboldt	45	−20	9.0	0.60	6.0
Independence	36	−19	8.2	1.39	14.0
Indianola	49	−17	12.6	1.33	13.5
Inwood	50	−30	7.7	1.00	10.0
Iowa City	48	−16	11.2	1.22	17.5
Iowa Falls	32	−18	6.5	1.10	13.5
Keosauqua	52	−10	15.4	0.78	7.5
Knoxville	48	−14	14.0	1.65	18.0
Lacona	.....	.....	.....	1.82	18.2
Larrabee	45	−29	8.6	1.30	13.0
Leclaire	.....	.....	.....	0.79	10.0
Lemars	45	−24	9.3	0.88	11.0
Lenox	47	−22	12.4	0.60	6.0
Leon	47	−15	15.0	0.91	9.2
Little Sioux	52	−27	11.8	1.24	12.4
Logan	47	−21	13.7	1.70	17.0
Maple Valley	.....	.....	.....	1.25	12.5
Maquoketa	43	−15	11.7	0.63	13.0
Marshalltown	41	−16	9.4	0.92	12.1
Mason City	38	−15	8.6	1.20	12.0
Massena	44	−19	13.2	0.66	10.0
Mountayr	50	−17	14.8	1.07	16.8
Mount Pleasant	52	−12	15.6	0.88	9.9
Mount Vernon	44	−17	12.4	1.21	15.3
Muscatine	.....	.....	.....	0.93	10.0
New Hampton	38	−18	7.2	0.47	4.7
Newton	43	−18	11.4	1.46	17.5
Northwood	52	−19	7.3	1.55	15.5
Odebolt	50	−25	10.2	0.94	11.5
Ogden	43	−18	10.2	0.95	9.5
Olin	42	−17	12.3	0.85	11.0
Onawa	47	−20	13.0	1.43	14.6
Osage	38	−19	6.6	1.03	10.3
Oskaloosa	48	−16	12.6	0.73	10.0
Ottumwa	51	−12	14.9	0.85	7.5
Pacific Junction	44	−22	13.4	0.96	9.3
Perry	42	−19	11.2	1.28	12.8
Plover	42	−22	7.8	1.45	14.5
Pocahontas	43	−21	9.6	1.15	11.5
Redoak	45	−15	16.6	0.65	6.0
Ridgeway	40	−18	10.2	1.33	8.8
Rock Rapids	50	−22	9.7	0.70	7.0
Rockwell City	45	−22	10.2	1.25	12.5
Sac City	45	−23	11.4	1.17	11.8
St. Charles	50	−16	15.2	1.24	13.4
Sheldon	46	−27	8.2	1.34	16.2
Sibley	42	−26	6.0	0.88	9.0
Sigourney	45	−17	14.4	1.11	13.5
Sioux Center	44	−27	8.9	1.30	13.0
Stockport	51	−12	16.7	0.94	9.5
Storm Lake	44	−26	6.2	0.12	1.5
Thurman	49	−21	13.6	0.91	.....
Tipton	46	−10	15.4	.....	.....
Toledo	44	−17	10.8	0.97	15.5
Vinton	40	−19	11.2	0.80	8.0
Wapello	49	− 8	18.4	0.72	7.1
Washington	47	−13	14.9	0.82	.....
Washta	.....	.....	.....	1.15	12.2
Waterloo	40	−16	8.2	0.74	8.0
Waukee	46	−18	13.2	1.65	16.5
Waverly	36	−20	7.6	1.14	11.4
Westbend	42	−19	8.6	1.75	17.5

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Iowa—Cont'd.					
Whatcheer	54	—17	14.9	0.50	5.0
Whitten	49	—20	9.1	1.30	13.0
Wilton Junction	52	—14	14.2	0.74	9.0
Winterset	45	—17	13.6	......	......
Woodburn	......	......	......	1.15	11.5
Zearing	39	—23	9.4	0.76	10.5
Kansas.					
Abilene	......	......	......	1.71	4.5
Achilles	61	—26	22.0	0.48	4.8
Alton	60	—25	19.4	0.95	9.5
Anthony	......	......	......	0.50	5.0
Atchison	52	—13	19.4	0.70	5.3
Baker	50	—17	16.4	0.62	5.0
Beloit	......	......	......	1.00	8.0
Blue Rapids	......	......	......	0.60	7.1
Burlington	64	—15	23.0	1.25	4.0
Chapman	60	—16	20.1	0.43	4.3
Clay Center	60	—22	18.3	1.18	9.7
Colby	......	......	......	0.44	4.5
Columbus	64	— 9	24.8	1.74	8.3
Cottonwood Falls	......	......	......	0.88	9.0
Cunningham	67[c]	—17[d]	23.3[d]	0.82	6.2
Dresden	58	—17	23.4	0.62	5.3
Eldorado	58	—15	23.0	1.25	5.8
Ellinwood	56	—18	22.2	1.03	8.8
Ellsworth	58	—24	20.8	1.06	6.5
Emporia	67	—12	22.4	0.46	7.0
Englewood	65	—17	26.0	0.90	6.5
Enterprise	......	......	......	0.94	6.0
Eureka	......	......	......	0.63	6.0
Fall River	65	—17	23.6	0.65	6.0
Farnsworth	62	—19	24.0	0.55	6.0
Forsha	60	—22	23.4	0.50	5.0
Fort Leavenworth	59	—13	21.6	0.80	8.0
Fort Scott	66	—10	23.8	1.17	7.8
Frankfort	52	—21	17.8	1.05	10.5
Garden City	65	—19	23.0	1.10	11.2
Gove	......	......	......	0.45	4.5
Grenola	63	—13	22.7	0.90	5.0
Hanover	54[i]	—15[i]	18.3[i]	0.80	8.0
Harrison	57	—28	16.0	1.11	12.9
Horton	51	—15	18.4	0.58	6.0
Hoxie	63	—16	25.4	0.40	4.0
Hugoton	65	—21	24.1	0.70	7.0
Hutchinson	59	—19	21.2	0.92	7.5
Independence	64	— 9	25.3	0.88	4.1
Iola	......	......	......	0.76	5.6
Jetmore	67	—21	23.4	0.80	8.0
La Crosse	62	—21	21.2	0.42	6.0
Lakin	58	—18	22.6	1.00	12.0
Larned	64	—22	20.8	1.00	6.0
Lawrence	59	—12	20.8	1.23	7.0
Lebanon	55	—25	18.3	1.10	11.0
Lebo	69	—15	20.6	1.00	4.2
Lindsborg	......	......	......	0.74	7.0
Macksville	58	—20	22.2	0.75	6.0
McPherson	56	—15	21.0	1.27	11.0
Madison	62	—19	21.6	1.03	8.0
Manhattan *b*	52	—14	20.6	1.15	10.7
Manhattan *c*	54	—13	20.1	0.73	7.0
Marion	......	......	......	0.60	6.0
Medicine Lodge	65	—20	25.7	0.75	7.5
Minneapolis	56	—19	19.1	0.74	7.4
Moran	63	—14	23.0	0.65	6.5
Mounthope	58	—10	25.8	1.14	5.5
Newton	54	—19	21.7	0.50	4.0
Norton	60	—22	20.2	0.85	7.5
Norwich	58	—13	23.6	0.74	6.5
Oberlin	......	......	......	0.95	8.0
Osage City	58[c]	—13[c]	21.0[c]	0.93	6.7
Osborne	......	......	......	0.77	7.8
Oswego	63	—11	25.2	1.50	7.0
Ottawa	63	—16	21.6	1.16	5.3
Phillipsburg	56[d]	—17[d]	19.1[d]	0.62	7.5
Plainville	42	—12	20.9	0.75	7.5
Pleasanton	62	—12	23.8	0.60	6.0
Pratt	65	—16	22.9	1.10	6.5
Republic	55	—30	16.2	0.83	10.0
Rome	56	—20	23.9	1.16	8.0
Russell	60	—17	20.8	0.72	7.5
Salina	57	—22	20.0	0.89	6.8
Sedan	64	—13	23.7	1.54	15.4
Toronto	65	—20	19.4	2.45	7.0
Ulysses	63	—21	23.0	1.40	14.0
Valley Falls	52	—15	20.0	0.65	6.0
Viroqua	66	—19	26.0	0.91	9.0
Wakeeney	55[c]	—15	21.1[c]	0.75	6.0
Wakeeney (near)	......	......	......	0.74	7.4
Wallace	64	—19	26.0	0.27	2.8
Walnut	63	—13	23.5	0.72	7.2
Wamego*[1]	50	—13	20.0	0.87	8.7
Winfield	50	—15	23.3	1.50	5.0
Kentucky.					
Alpha	68	— 4	32.4	3.79	20.5
Anchorage	63	— 5	26.1	1.02	9.9
Bardstown	66	— 4	28.8	2.87	13.2
Beattyville	65	— 5	26.4	2.14	16.0
Beaver Dam	66	— 5	27.1	2.46	13.5

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Kentucky—Cont'd.					
Berea	64	— 6	30.0	1.91	11.0
Blandville	62	— 4	26.6	3.33	9.4
Bowling Green	67	5	29.2	3.21	......
Burnside	64	— 4	30.3	2.41	12.5
Cadiz	67	— 4	28.8	2.44	12.5
Calhoun	66	— 5	28.6	2.65	2.1
Catlettsburg	65	0	28.5	2.56	12.0
Earlington	66	— 4	27.2	3.11	15.0
Edmonton	65	— 6	29.2	2.84	23.1
Eubank	65	— 7	25.6	2.15	19.5
Falmouth	......	......	......	2.38	10.0
Farmers	62	—15	26.0	2.25	16.0
Frankfort	61	— 3	27.8	2.16	......
Franklin	64	— 4	30.6	3.09	16.9
Greensburg	67	— 5	27.5	3.12	17.2
Highbridge	64	— 5	28.0	3.36	......
Hopkinsville	65	— 6	28.4	3.18	15.0
Irvington	63	— 5	28.0	1.95	8.0
Jackson	70	— 2	31.8	2.80	19.0
Leitchfield	65	— 5	27.0	2.70	14.2
Loretto	65	— 5	31.4	1.73	1.7
Manchester	66	— 4	29.0	3.25	26.5
Marion	65	— 7	28.2	3.41	6.0
Mayfield	63	— 3	29.3	3.48	12.2
Maysville	65	— 1	25.3	2.25	10.6
Middlesboro [b]	59	— 1	31.5	2.20	4.0
Mount Sterling	59	— 4	26.6	4.31	14.5
Owensboro	60	— 3	27.8	2.54	9.3
Owenton	57	— 5	24.7	2.85	14.5
Paducah *a*	......	......	......	3.72	8.0
Paducah *b*	64	— 2	29.8	3.17	7.3
Princeton	66	— 5	29.4	2.99	10.3
Richmond	63	— 5	26.9	2.34	......
St. John	62	— 6	25.1	2.60	13.8
Scott	59	— 2	25.6	1.88	9.1
Shelby City	64	— 7	27.0	2.43	18.0
Shelbyville	60	— 4	25.7	2.45	5.9
Taylorsville	61	— 3	26.8	2.34	8.5
Williamsburg	68	— 2	30.4	1.73	12.2
Williamstown	62	— 5	26.8	2.14	9.4
Louisiana.					
Abbeville	76	19	47.9	5.70	
Alexandria	76	16	43.6	5.90	
Amite	75	13	46.4	6.20	
Baton Rouge	76	17	47.5	6.94	
Burnside	75	18	49.0	6.80	
Calhoun	72	13	40.3	6.34	
Cameron	67	22	48.5	6.09	
Caspiana	73	17	42.6	4.49	
Cheneyville	72	18	44.1	4.45	
Clinton	74	16	46.0	6.71	
Collinston	70	15	39.4	7.60	
Covington	72	18	44.6	8.40	
Donaldsonville	75	18	50.0	7.29	
Emilie	71	19	49.1	7.88	
Farmerville	74[f]	16[f]	42.6[f]	6.02	
Franklin	76	20	48.0	4.72	
Georgetown	73	14	43.1	5.83	
Grand Coteau	75	16	47.9	6.70	
Hammond	71	18	46.9	5.93	
Houma	72	17	46.7	3.74	
Jennings	77	20	46.2	4.22	
Lafayette	71[e]	......	......	......	
Lake Charles	76	20[b]	45.4[d]	5.00	
Lakeside	72	22	49.4	3.71	
Lawrence	74	......	......	5.53	
Leesville	82	16	45.6	5.55	
Libertyhill	75	15	42.2	4.40	T.
Logansport	......	......	......	3.40	
Mansfield	74	14	39.6	4.43	
Melville	79	16	46.2	6.50	
Minden	72	15	38.2	6.05	
Monroe	75	15	42.0	6.12	
Morgan City	......	......	......	3.25	
New Iberia	74	18	49.2	5.15	
Opelousas	76	18	46.2	6.71	
Plain Dealing	73	13	38.6	4.65	
Port Eads	73	28	52.6	6.53	
Rayne	76	20	48.0	6.39	
Reserve	71[b]	22[c]	49.3[b]	6.67	
Robeline	73	15	40.8	2.75	
Ruston	72	13	41.2	5.20	
Schriever	......	19	......	5.53	
Southern University	......	..	......	6.81	
Sugar Experiment Station	75	21	50.6	6.48	
Sugartown	71	18	45.7	6.56	
Summerport	......	......	......	7.42	
Venice	78	24	51.4	6.91	
Maine.					
Bar Harbor	47	—15	17.1	5.20	31.5
Chesuncook	......	......	......	2.67	33.5
Cornish	45	—14	15.2	5.53	32.0
Danforth	......	......	......	5.75	43.5
Fairfield	46	—33	12.6	3.78	30.0
Farmington	44	—30	12.2	3.79	26.5
Gardiner	47	—33	12.9	4.85	27.2
Houlton	42	—32[e]	5.0	3.55	48.0
Lewiston	48	—22	14.9	4.42	30.3

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Maine—Cont'd.					
Madison	46	—32	12.3	4.08	17.8
Mayfield	40	—15	13.2	4.25	33.0
Millinocket	45	—35	8.5	5.45	31.0
North Bridgton	47	—28	16.2	4.67	29.0
Oquossoc	41	—36	7.2	3.33	36.5
Orono	48	—30	12.8	4.28	25.5
Patten	48	—35	10.2	4.20	42.0
Rumford Falls	46	—26	13.5	3.90	26.2
South Lagrange	46	—31	10.0	3.76	30.3
The Forks	......	......	......	3.39	33.2
Vanburen	40	—45	1.7	1.42	15.5
Vanceboro	48	—39	10.6	4.00	41.0
Winslow	44	—30	11.1	3.66	22.5
Maryland.					
Annapolis	......	5	......	4.59	20.0
Bachmans Valley	57	—10	25.3	4.34	13.0
Boettcherville	63	— 3	28.2	1.67	12.5
Cambridge	65	5	31.9	3.26	16.5
Cheltenham	63	— 5	28.9	3.66	......
Chestertown	58	— 6	28.0	4.44	26.8
Chewsville	63	— 6	26.4	3.24	22.2
Clearspring	64	0	26.5	4.27	18.0
Coleman	63	— 1	29.6	3.26	14.0
Collegepark	68	—13	28.9	2.81	10.5
Colora	......	......	......	4.31	21.0
Cumberland	......	......	......	1.49	......
Darlington	60	— 2	27.5	4.07	12.0
Deerpark	......	......	......	3.67	36.4
Denton	67	—10	30.0	3.88	21.2
Easton	61	— 7	30.4	3.76	16.3
Fallston	59	1	27.7	4.10	15.0
Frederick	68	— 9	29.5	4.09	12.5
Grantsville	58	—14	22.2	3.75	32.0
Greatfalls	64	1	28.3	3.45	......
Greenspring Furnace	64	— 2	27.4	3.54	20.2
Hancock	69	0	28.0	3.66	13.8
Harney	......	......	......	4.13	17.5
Jewell	64	1	30.3	4.03	14.0
Johns Hopkins Hospital	64	6	31.8	4.72	14.5
Keedysville	65	— 9	27.8	4.40	19.5
Laurel	63	4	29.8	......	12.5
Mount St. Marys College	65	2	29.4	3.84	16.5
New Market	61	5	28.0	4.07	19.0
Oakland	55	—14	22.5	......	......
Pocomoke City	62	6	33.6	3.69	8.8
Porto Bello	61	6	31.3	2.82	......
Prince Fredericktown	61	3	30.5	3.93	14.2
Princess Anne	63	— 6	31.4	3.48	8.6
Seaford	60	— 4	29.8	4.58	21.0
Solomons	61	5	31.4	3.00	14.0
Sudlersville	62	—10	29.3	4.14	21.0
Takoma Park	65	0	27.6	4.44	15.8
Van Bibber	58	3	28.4	3.63	......
Westernport	58	1	26.4	2.25	22.5
Woodstock	62	— 2	29.6	3.87	13.2
Massachusetts.					
Amherst	51	—13	20.7	3.90	21.0
Bedford	48	— 5	22.6	4.38	22.5
Bluehill (summit)	49	0	22.1	4.98	28.6
Cambridge	50	0	23.4	6.13	......
Chestnuthill	50	— 3	23.4	5.49	24.9
East Templeton*[1]	44	— 8	18.7	3.87	29.0
Fall River	50	5	25.5	3.92	20.5
Fitchburg *b*	49	— 5	20.6	5.56	30.0
Framingham	56	— 8	22.8	5.30	......
Groton	48	—10	19.2	4.55	37.5
Hyannis	......	......	......	4.42	14.5
Jefferson	......	......	......	5.93	33.8
Lawrence	47	— 8	20.2	4.48	22.0
Leominster	......	......	......	5.36	24.4
Lowell *a*	48	—10	22.2	6.96	......
Ludlow Center	46	—16	16.8	4.03	27.5
Middleboro	61	—10	24.4	3.55	11.8
Monson	50	—13	20.6	4.32	32.0
New Bedford	50	1	24.2	3.73	17.1
Pittsfield	......	......	......	4.64	......
Princeton	......	......	......	5.67	32.5
Provincetown	55	8	29.0	5.31	19.8
Salem	......	......	......	4.20	27.2
Somerset*[1]	48	— 4	23.9	4.17	18.5
Taunton	50	—11	23.6	4.05	......
Webster	......	......	......	3.97	22.2
Westboro	49	— 8	23.5	3.67	19.5
Weston	49	— 9	22.2	5.05	24.4
Williamstown	49	— 8	18.0	1.91	27.2
Winchendon	......	......	......	4.01	27.2
Worcester	48	0	21.8	3.73	26.8
Michigan.					
Adrian	51	— 9	18.8	1.30	10.0
Agricultural College	49	— 1	18.2	1.07	10.7
Allegan	37[e]	— 5[e]	20.6[e]	1.45	14.5
Alma	43	— 8	18.0	1.76	19.5
Ann Arbor	47	— 3	18.4	1.64	7.9
Arbela	42	— 8	17.8	2.22	17.5
Baldwin	36	—14	15.4	1.70	17.0
Ball Mountain	48	— 5	18.2	1.07	9.3
Baraga	......	......	......	1.80	18.5
Battlecreek	44	— 6	17.8	1.55	13.0

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bay City	40	—15	16.9	3.23	21.5
Benzonia	39[b]	3[b]	17.1[b]	3.40	33.5
Berlin	42[e]	— 6[e]	17.2[e]	1.72	13.5
Big Rapids	36	— 9	15.6	1.61	15.0
Birmingham	45	— 2	18.4	0.94	9.4
Bloomingdale	44	— 3	20.2	1.15	17.5
Calumet	40	— 2	13.3	2.96	37.0
Cassopolis	44	— 7	18.9	2.10	15.0
Charlotte	50	— 9	18.9	0.77	7.7
Chatham	36	—19	10.9	2.39	23.7
Cheboygan	40	—13	15.5	1.50	15.0
Clinton	47	— 9	19.2	1.66	9.0
Coldwater	48	— 7	20.0	2.27	16.0
Deer Park	39	— 2	14.6	2.85	26.0
Detour	37	—10	13.8	0.80	8.0
Dundee	50	— 8	19.5	2.43	16.1
Eagle Harbor	41	— 3	16.6	3.73	......
East Tawas	47	— 8	17.1	2.34	23.7
Eloise	47	— 8	19.2	......	......
Ewen	43	—24	6.4	1.00	10.0
Fennville	50	— 1	22.2	1.35	13.5
Fitchburg	50	— 8	16.4	2.40	21.0
Flint	42	—13	17.4	1.46	10.0
Frankfort	42[f]	— 5[f]	21.6[f]	3.10	32.0
Gaylord	......	......	......	1.15	11.5
Gladwin	38	—14	15.4	1.00	10.0
Grand Haven	40	5	20.3	0.75	7.5
Grape	32	— 9	18.6	1.43	10.2
Grayling	43	—15	14.2	2.15	21.5
Hagar	45	1	20.2	2.24	15.6
Harbor Beach	43	— 5	18.4	0.71	7.1
Harrison	39	— 5	15.0	1.20	12.0
Harrisville	40	— 7	15.8	2.50	25.0
Hastings	45	— 9	18.1	1.17	11.5
Hayes	41	—12	17.0	1.70	17.0
Hillsdale	47	— 7	18.0	2.01	12.5
Howell	46	— 6	15.7	0.79	10.1
Humboldt	40	—28	3.4	1.65	16.5
Iron Mountain	39	—14	9.8	1.00	10.0
Iron River	38	—24	7.2	0.80	11.0
Ironwood	44	—16	8.0	1.69	16.9
Ishpeming	30	—11	8.9	3.00	30.0
Ivan	44	—11	12.5	1.48	24.0
Jackson	47	— 4	19.2	2.35	14.5
Jeddo	41	— 4	18.1	2.20	20.0
Kalamazoo	38	— 4	18.4	......	......
Lake City	34	— 4	15.7	1.20	12.0
Lansing	44	— 2	19.0	1.68	11.5
Ludington	40	6	21.2	2.40	24.0
Mackinac Island	35	— 6	15.2	1.85	15.5
Mackinaw City	38	—12	16.0	2.10	21.0
Mancelona	40	—14	14.4	2.00	32.0
Manistee	......	......	......	1.60	16.0
Marine City	45	— 5	19.4	1.38	12.5
Menominee	42	—11	13.1	1.40	14.0
Midland	45	—10	19.0	1.05	10.5
Montague	41	1	19.0	2.50	25.0
Muskegon	42	1	20.2	2.35	16.5
Newberry	30	—15	7.6	1.10	11.0
Old Mission	40	3	17.8	1.26	12.6
Olivet	44	— 1	18.1	1.66	6.8
Omer	......	......	......	1.40	14.0
Onaway	40	—16	13.2	0.65	6.5
Ovid	42	— 5	17.6	1.70	12.0
Owosso	38[d]	— 9[i]	17.2[g]	1.20	12.0
Petoskey	40	— 5	16.8	1.90	19.0
Plymouth	46	— 7	18.8	1.00	10.0
Port Austin	46	— 8	18.8	1.60	16.0
Powers	......	......	......	2.40	24.0
Reed City	40	—12	15.9	2.15	21.5
Roscommon	34[j]	—21[h]	11.2[i]	1.45	14.5
Saginaw (W. S.)	41	— 5	18.2	1.93	22.0
St. Ignace	36	—10	16.9	0.40	4.0
St. Johns	49	— 3	20.8	2.13	20.8
Slocum	36	—10	18.0	......	......
South Haven	39	0	20.2	0.79	13.0
Stanton	43	— 8	16.0	1.33	13.3
Thomaston	44	—25	6.4	1.60	16.0
Thornville	39	—11	18.1	1.62	19.5
Vassar	42	—14	16.6	1.92	13.2
Wasepi	47	— 6	17.6	2.50	15.0
Waverly	42	— 9	19.2	1.35	13.5
Webberville	43	— 9	17.6	1.36	11.5
West Branch	......	......	......	2.40	24.0
Wetmore	40	0	13.8	2.40	24.0
Whitefish Point	38	— 7	15.0	1.72	19.2
Ypsilanti	48	—10	17.7	1.97	11.1
Minnesota.					
Albert Lea	34	—20	4.4	0.70	7.0
Alexandria	35	—25	1.2	0.63	6.8
Angus	34	—33	2.0	......	......
Ashby	41	—24	3.4	0.78	9.2
Beaulieu	30	—37	0.1	0.22	3.0
Bemidji	42	—34	3.8	0.27	2.7
Bird Island	38	—24	4.8	0.73	7.8
Caledonia	36	—21	6.2	0.87	8.5
Collegeville	45	—21	7.4	0.49	5.7
Crookston	33	—28	—1.2	0.75	7.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Minnesota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Detroit	30	—38	—3.8	0.43	4.5
Faribault	40	—27	4.6	0.44	6.5
Farmington	40	—22	5.4	0.90	9.0
Fergus Falls	32	—28	1.4	0.55	5.5
Floodwood	45	—33	3.9	0.60	8.0
Glencoe	50	—20	6.4	0.45	4.5
Grand Meadow	39	—23	3.3	1.15	12.3
Hallock	33	—39	—4.9	0.52	5.2
Hovland	......	......	......	1.34	13.4
Lake Winnibigoshish	25	—35	—0.2	0.46	4.9
Leech	34	—38	0.1	0.23	3.5
Long Prairie	39	—29	3.4	0.56	5.5
Luverne	42	—21	8.1	1.60	16.0
Lynd	39	—22	12.7	0.38	4.0
Mankato	......	......	......	0.45	9.0
Mapleplain	39	—22	5.6	1.05	12.3
Milaca	50	—28	6.0	0.60	6.0
Milan	33	—28	3.6	0.89	8.9
Minneapolis [1]	37*	—30	5.8	0.62	6.7
Montevideo	34	—26	5.2	0.43	4.2
Mora	44	—27	5.2	0.38	4.0
Morris	32	—27	2.8	0.30	3.0
Mount Iron	34	—29	2.6	0.45	4.5
New London	35	—25	3.1	0.24	3.0
New Richland	39[c]	—22[c]	6.6[c]	1.35	13.5
New Ulm	50	—21	6.2	1.20	12.0
Park Rapids	28	—32	—0.7	0.62	6.1
Pine River	33	—35	0.0	0.13	3.0
Pleasant Mounds	42	—20	7.3	0.47	7.8
Pokegama Falls	30	......	......	0.47	7.5
Reeds	......	......	......	0.30	8.9
Rolling Green	41	—20	7.2	0.90	9.0
St. Charles	45	—20	7.6	0.84	8.2
St. Cloud	47	—24	6.5	0.49	7.0
St. Peter	45	—27	6.2	0.94	9.4
Sandy Lake Dam	33	—32	2.2	0.85	9.0
Shakopee	34	—24	3.9	1.31	13.0
Stillwater	......	......	......	0.80	8.0
Wabasha	41	—21	6.4	0.75	9.1
Wadena	33	—31	1.0	0.38	8.7
Willow River	46	—34	3.8	0.39	4.9
Winnebago	44	—20	6.6	0.76	9.5
Winona	46	—18	5.2	0.57	5.2
Worthington	45	—24	13.1	0.76	7.6
Zumbrota	38	—21	5.7	1.10	11.0
Mississippi.					
Aberdeen	66	9	33.7	7.12	
Agricultural College	67	12[e]	38.8[e]	6.13	
Austin	67	6	34.6	6.54	T.
Batesville	67	8	35.6	5.90	
Bay St. Louis	71	18	47.2	6.57	
Biloxi	68[c]	18[c]	47.4[c]	4.14	
Booneville	63	6	34.2	6.77	4.0
Canton	73	13	41.6	4.17	
Columbus	66	11	35.6	7.00	
Corinth	62	5	33.0	5.32	4.0
Crystal Springs	74	14	41.8	5.83	
Duck Hill	70	10	38.2	6.65	
Edwards	70	11	41.2	4.83	
Enterprise	......	......	......	8.00	
Fayette	72	15	42.7	6.35	
Fayette (near)	......	......	......	5.43	
Greenville*a*	70	13	38.0	7.31	
Greenville*b*	71	14	38.6	7.88	
Greenwood	72	12	37.7	6.78	
Hattiesburg	......	......	......	6.90	
Hazlehurst	72	14	42.3	8.95	
Hernando	67	8	34.4	4.42	1.0
Holly Springs	64	5	32.0	4.78	1.0
Jackson	72	15	40.2	5.72	
Kosciusko	70	9	39.5	4.18	
Lake	71	12	40.9	5.65	
Lake Como	72	12	42.5	7.69	
Laurel	70	13	42.4	7.53	
Leakesville	75	9	44.4	5.95	
Louisville	70	12	39.6	4.34	
McNeill	......	16	....	7.77	
Magee	71	13	42.6	6.08	
Magnolia	74	15	47.1	6.29	
Merrill	......	......	......	6.29	
Natchez	74[d]	17[d]	45.6[d]	......	
Nitta Yuma	67	15	38.4	5.76	
Okolona	64	7	33.0	4.85	T.
Patmos	......	......	......	5.60	
Pearlington	73	18	47.6	5.71	
Pecan	76	16	48.1	7.40	
Pittsboro	67	8	36.4	6.92	
Pontotoc	66	7	34.8	7.96	T.
Poplarville	77	16	45.1	7.11	
Port Gibson	74	12	42.8	5.16	
Shelby	73	9	36.3	5.35	
Shoccoe	71	10	40.2	5.71	
Shubuta	......	......	......	8.61	
Stonington	......	......	......	5.25	
Suffolk	70	14	44.0	6.84	
Tchula	71	14	40.3	5.47	
Tupelo	67	8	34.8	7.72	
University	70	8	36.8	7.23	2.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Utica	71	15	42.2	5.39	
Walnutgrove	70[e]	12[e]	42.1[e]	5.93	
Watervalley	67	8	36.6	7.55	T.
Waynesboro	70	14	45.4	5.95	
Woodville	70	15	45.8	6.44	
Yazoo City	72	15	39.8	4.60	
Missouri.					
Albany	......	......	......	0.60	6.0
Appleton City	65	—14	22.5	1.32	6.5
Arthur	70	—17	25.4	1.20	7.0
Avalon	58	—13	19.2	0.40	4.0
Bethany	50	—15	16.9	0.55	5.6
Birchtree	62	— 8	27.0	3.03	7.0
Blue Springs	60	—11	20.6	0.45	3.4
Boonville	......	......	......	1.52	3.6
Brunswick	60	—11	19.7	1.13	10.8
Cape Girardeau	......	......	......	4.45	13.7
Carrollton	61[f]	—10[f]	20.2[f]	0.30	3.0
Caruthersville	67	— 1	31.6	3.17	7.0
Conception	49	—18	16.0	0.70	7.0
Darksville	60	—11	20.8	0.70	7.0
Dean	67	— 9	28.4	3.12	5.2
Doniphan	67	— 3	28.9	3.20	10.0
Downing	......	......	......	0.90	6.0
Fairport	......	......	......	0.43	4.8
Fayette	60	—10	18.9	0.94	5.8
Fulton	67	—10	21.0	2.08	3.1
Gallatin *[1]	60	—10	18.8	0.32	3.2
Gano	65	—10	25.4	3.20	11.6
Glasgow	63[f]	—10[f]	20.5[f]	0.88	9.0
Goodland [f]	47	—10	23.8	1.90	9.5
Gorin	......	......	......	0.56	4.2
Grant City	49	—16	17.0	1.00	10.0
Harrisonville	60	—10	20.0	0.84	5.7
Hazlehurst	......	......	......	0.80	3.0
Hermann	......	......	......	2.26	5.0
Houston	62	— 9	25.9	3.25	8.1
Ironton	64	— 9	24.6	3.26	7.0
Jackson	68	— 5	27.8	2.90	10.0
Jefferson City	67	— 9	21.4	2.18	5.0
Joplin	67	— 8	27.6	3.30	12.5
Kidder	58	—13	18.2	0.83	1.4
Koshkonong	61	— 8	27.1	3.19	9.5
Lamar	68	—10	24.6	2.41	8.0
Lamonte	......	......	......	0.69	5.0
Lebanon	62	— 9	24.2	3.55	12.5
Lexington	62	—10	22.0	0.95	3.0
Liberty	60	—12	20.5	0.97	4.6
Lockwood	66	—12	24.0	3.04	6.0
Louisiana	62	— 8	22.4	2.36	6.8
Macon	60	— 9	21.0	1.03	10.0
Marblehill	68	— 5	27.4	2.93	6.1
Marshall	62	— 9	21.3	0.73	4.3
Maryville	49	—17	11.0	0.98	9.8
Mexico	66	— 9	20.6	1.84	7.0
Miami *[5]	58	—10	19.9	0.75	5.2
Monroe	60	— 9	19.8	1.10	4.1
Montreal	66	—12	23.6	2.81	6.8
Mountaingrove	61	—11	24.9	3.71	8.0
Mount Vernon	64	—12	24.8	2.69	7.5
Neosho	66	— 9	27.6	2.13	6.5
New Haven	69	— 6	24.5	3.03	8.5
New Madrid	......	......	......	2.57	
New Palestine	66	— 7	23.4	1.37	3.7
Oakfield	69	— 8	24.5	3.16	8.9
Olden	63	— 9	27.4	2.60	2.3
Oregon	50	—19	15.7	0.92	10.1
Osceola	......	......	......	1.80	......
Pine Hill	......	......	......	2.65	4.9
Princeton	54	—13	17.3	0.65	6.0
Rockport	......	......	......	1.34	10.3
Rolla	......	......	......	3.24	10.8
St. Charles	67	— 8	24.0	3.28	5.8
St. Joseph	......	......	......	0.45	4.5
Sarcoxie	......	......	......	3.04	8.4
Sedalia	63	—10	22.6	1.29	6.3
Seymour	64	—12	24.0	3.08	6.5
Sikeston	65	— 3	28.8	3.21	10.5
Steffenville	54	— 8	20.6	0.17	1.5
Trenton	53	—12	19.0	0.77	4.0
Unionville	52	—15	14.4	1.09	11.6
Versailles	65	—10	23.1	2.09	6.6
Vichy	72	—14	20.8	0.80	8.0
Warrensburg	63	—10	22.9	1.12	4.0
Warrenton	68	— 8	20.2	2.32	8.5
Warsaw	66	—19	22.2	1.64	3.2
Wheatland	......	......	......	2.30	8.0
Willowsprings	63	—12	24.8	4.28	12.0
Windsor [e]	48	—13	20.3	1.88	18.8
Zeitonia	65	—10	25.8	1.59	6.0
Montana.					
Adel	52	—27	19.2	0.30	3.0
Anaconda	50	—13	23.5	0.70	7.0
Augusta	55	—28	18.2	0.40	4.0
Billings	58	—15	22.2	0.92	9.2
Boulder	50	—13	22.2	0.31	3.6
Bozeman	48	—12	20.7	0.23	2.3
Butte	47	— 9	24.2	0.70	7.0

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Montana—Cont'd.					
Canyon Ferry	45	− 8	21.6	0.12	1.8
Cascade	56	−21	19.4	0.23	4.5
Chester	45[c]	−32[c]	9.4[c]	1.01	10.1
Chinook	49[c]	−24	7.0[c]	0.71	.....
Columbia Falls	46	− 1	24.3	2.14	6.1
Crow Agency	53	−20	19.4	1.30	13.0
Culbertson	39	−34	2.6	0.23	2.5
Dayton	47	− 9	22.4	1.18	5.4
Decker	50	−26	21.4	0.30	3.0
Deerlodge	49	−14	22.6	.....	.....
Dillon	50	−13	24.4	0.60	6.0
Fallon	41	.....	7.3	0.07	1.8
Forsyth	53	−22	13.3	0.60	6.0
Fort Harrison	50	−12	20.8	.....	.....
Fort Logan	42	−18	15.8	0.19	1.9
Glasgow	35	−38	− 0.4	0.13	.....
Glendive	40	−45	3.2	0.80	8.0
Grayling	.....	−28	.....	0.57	7.0
Greatfalls	47	−21	18.2	0.32	.....
Lakeview	.....	.....	.....	0.30	3.0
Lame Deer	48	−21	17.8	1.30	13.0
Livingston	56	− 9	25.2	0.32	4.5
Lewistown	50	−20	18.0	0.40	4.0
Lodgegrass	52	−22	20.0	0.60	12.0
Martinsdale	53	−14	21.0	0.57	.....
Marysville	45	−12	19.6	0.84	9.0
Missoula	54	1	27.0	0.67	2.0
Ovando	41	−16	19.0	1.09	8.8
Parrot	.....	−10	22.5[c]	0.04	.....
Philipsburg	53	−19	22.3	0.06	0.6
Plains	44	− 2	26.3	0.35	.....
Poplar	38	−32	4.3	0.60	6.0
Redlodge	54	−20	20.5	0.41	8.0
St. Pauls	50	−17	15.8	0.53	9.5
St. Peter	49	−16	21.0	0.11	2.5
Saltese	.....	.....	.....	1.80	18.0
Springbrook	45	−30	8.0	0.64	6.4
Toston	48	− 9	23.0	0.10	1.0
Troy	46	− 2	27.4	1.47	6.0
Twin Bridges	53	−12	23.4	0.01	0.1
Utica	.....	.....	.....	0.19	2.0
Warrick	.....	.....	.....	1.04	10.4
Wolf Creek	52	−15	21.5	0.29	4.6
Yale	55	−21	19.0	0.81	8.1
Nebraska.					
Agate	55	−33	19.2	0.52	15.4
Agee *[1]	44	−24	11.4	1.47	14.8
Albion	49	−24	13.0	2.20	22.0
Alliance	63	−31	22.2	0.80	8.0
Alma	62	−29	18.2	0.75	7.5
Ansley	56	−22	15.6	1.40	14.0
Arapaho	.....	.....	.....	0.95	9.0
Arcadia	.....	.....	.....	0.75	11.0
Ashland *a*	54	−21	14.7	0.95	15.8
Ashton	.....	.....	.....	1.40	14.0
Auburn	52	−19	16.0	1.00	10.0
Aurora	53	−20	16.9	0.70	10.0
Bartley	60	−24	20.3	0.65	6.5
Beatrice	56	−20	17.6	0.77	8.0
Beaver	58	−19	21.2	0.63	7.0
Bellevue	.....	.....	.....	1.54	20.4
Benkleman	.....	.....	.....	0.40	4.0
Blair	52	−23	12.2	0.97	13.2
Bluehill	.....	.....	.....	0.95	9.5
Bradshaw	.....	.....	.....	1.26	14.8
Bridgeport	58	−33	22.1	1.30	13.0
Broken Bow	59	−23	17.2	0.93	10.0
Burchard	.....	.....	.....	0.48	7.6
Burge	.....	.....	.....	1.46	14.8
Burwell	.....	.....	.....	1.30	13.0
Central City	.....	.....	.....	1.90	19.0
Chester	.....	.....	.....	1.20	12.0
Cody	.....	.....	.....	0.41	4.1
Columbus	53	−25	12.6	1.16	16.0
Crawford	.....	.....	.....	1.12	11.5
Crete	57	−22	15.6	0.80	8.4
Culbertson	63	−22	25.4	0.48	6.0
Curtis	57	−22	19.0	1.10	11.0
David City	51	−24	14.0	1.44	15.9
Dawson	52	−17	17.3	0.74	7.4
Duff	.....	.....	.....	1.20	12.0
Dunning	.....	.....	.....	1.30	13.0
Edgar	.....	.....	.....	1.00	10.0
Ericson	.....	.....	.....	2.00	20.0
Ewing	.....	.....	.....	1.20	12.0
Fairbury	57	−24	15.2	1.07	13.8
Fairmont	54	−24	12.6	1.30	13.0
Fort Robinson	54	−17	21.8	1.13	11.2
Franklin	61	−25	19.0	1.00	10.0
Fremont	53	−24	13.1	1.60	16.0
Fullerton	.....	.....	.....	2.30	23.0
Geneva	54	−24	15.3	1.05	10.5
Genoa (near)	50	−25	13.9	0.91	19.6
Gering	52	−29	24.8	1.17	13.5
Gordon	.....	.....	.....	0.94	9.4
Gothenburg	58	−23	19.5	1.05	10.5
Grand Island *a*	.....	.....	.....	1.64	16.6
Grant	58	−26	21.9	0.17	4.0
Nebraska—Cont'd.					
Greeley	.....	.....	.....	1.40	14.0
Guide Rock	.....	.....	.....	1.42	14.2
Haigler	.....	.....	.....	0.56	.....
Halsey	55	−26	17.4	0.55	8.0
Hartington	50	−20	10.7	1.70	17.0
Harvard	52	−21	14.0	1.06	10.3
Hastings *[1]	53	−18	16.8	1.25	13.0
Hayes Center	.....	.....	.....	1.00	10.0
Hay Springs	46	−30	14.6	1.00	10.5
Hebron	55	−21	15.2	1.48	14.7
Hendley	.....	.....	.....	0.80	8.0
Hickman	.....	.....	.....	0.82	8.2
Holbrook	.....	.....	.....	1.04	10.8
Holdrege	58[e]	−26[e]	18.2[e]	0.80	8.0
Holly	.....	.....	.....	1.01	10.2
Hooper *[1]	51	−20	12.5	1.02	14.9
Imperial	57	−26	22.2	0.84	10.2
Johnstown	.....	.....	.....	1.20	12.0
Kearney	57	−21	18.7	0.98	.....
Kennedy	53	−26	16.3	1.83	17.5
Kirkwood	61	−23	16.0	1.20	12.0
Leavitt	54[b]	−22[e]	14.2[b]	.....	.....
Level	.....	.....	.....	0.80	8.0
Lexington	58	−23	18.0	1.20	12.0
Lodgepole	59	−27	22.5	0.60	6.0
Loup	52	−21	16.6	0.45	9.0
Lynch	.....	.....	.....	1.30	13.0
McCook	.....	.....	.....	0.70	7.2
McCool	.....	.....	.....	1.50	.....
Madison	50	−23	12.2	1.65	16.5
Marquette	.....	.....	.....	1.15	11.5
Mason	.....	.....	.....	1.22	12.2
Merriman	.....	.....	.....	0.90	9.0
Minden	57	−20	16.3	0.99	11.5
Monroe	.....	.....	.....	0.92	14.5
Nebraska City	51	−18	15.6	1.00	10.0
Nemaha	.....	.....	.....	0.80	8.0
Norfolk	51	−26	12.0	0.94	16.5
North Loup	53	−25	15.4	1.25	15.2
Oakdale	48	−24	10.6	0.78	9.6
Odell	.....	.....	.....	1.40	14.0
O'Neill	53	−23	14.8	0.73	13.2
Ord	.....	.....	.....	1.45	14.5
Osceola	.....	.....	.....	0.82	.....
Palmer	.....	.....	.....	1.30	13.0
Palmyra *[1]	50	−20	14.9	0.75	9.0
Pawnee City	50	−20	16.4	0.92	8.3
Plattsmouth *b*	.....	−18	.....	1.10	11.0
Plymouth	.....	.....	.....	1.60	16.0
Purdum	59	−27	17.0	0.95	9.5
Ravenna *a*	56	−20	17.4	1.25	13.2
Redcloud	56	−25	14.6	.....	.....
Republican	.....	.....	.....	0.70	7.0
Rulo	.....	.....	.....	1.03	6.0
St. Libory	.....	.....	.....	1.80	18.0
St. Paul	53	−21	17.2	1.14	11.4
Santee	47	−26	11.9	0.86	10.3
Schuyler	.....	.....	.....	1.60	16.0
Seneca	.....	.....	.....	1.50	15.0
Seward	55	−22	13.5	0.58	13.1
Smithfield	.....	.....	.....	1.25	12.5
Springview	57	−22	14.8	1.40	14.0
Stanton	49	−26	12.2	1.70	17.0
Strang	.....	.....	.....	1.25	12.5
Stratton	.....	.....	.....	0.50	5.0
Superior	54	−25	12.8	1.20	12.0
Syracuse	.....	.....	.....	0.80	8.0
Tablerock	.....	.....	.....	1.14	11.0
Tecumseh	.....	.....	.....	0.98	8.8
Tekamah	52	−22	11.9	1.90	19.0
Turlington	52	−19	14.9	1.28	12.3
University Farm	54	−22	15.6	0.91	.....
Wahoo	.....	.....	.....	1.20	12.0
Wakefield	50	−24	10.9	1.36	13.6
Wauneta	.....	.....	.....	0.80	8.0
Weeping Water	.....	.....	.....	1.11	13.5
Westpoint	56	−25	12.3	1.23	13.4
Whitman	.....	.....	.....	0.50	5.0
Wilber	.....	.....	.....	0.75	10.7
Wilsonville	.....	.....	.....	0.71	9.0
Winnebago	51	−30	9.4	0.66	13.0
Wisner	.....	.....	.....	1.95	19.5
Wymore	.....	.....	.....	1.50	15.0
York	52	−18	12.4	1.28	14.0
Nevada.					
Amos	57	10	34.8	0.65	
Austin	53	12	34.0	0.70	.....
Battle Mountain	56	8	38.0	T.	
Belmont	48	11	31.3	0.17	2.0
Beowawe *[1]	50	10	36.0	T.	
Caliente	68	5	39.2	0.09	0.4
Candelaria	56	11	36.8	0.25	2.5
Carlin *[1]	42	0	25.2	.....	T.
Carson City	66	17	38.2	0.36	0.1
Cranes Ranch	.....	.....	.....	0.59	.....
Dyer	61	2	35.3	0.26	2.0
Elko	60	− 8	29.6	0.25	T.
Eureka	55	5	31.8	2.60	3.0
Nevada—Cont'd.					
Geyser	58[1]	−10	28.6[e]	0.60	5.7
Golconda	.....	.....	.....	1.15	.....
Halleck *[5]	55	− 8	27.7	1.00	T.
Hawthorne	61	18	40.0	0.00	
Humboldt	57	13	40.2	0.33	.....
Lewers Ranch	63	15	39.8	1.86	4.0
Lovelocks	57	5	34.4	T.	
Mill City *[1]	54	12	35.8	0.25	.....
Palisade	59	4	31.6	0.00	
Palmetto	60	− 1	32.5	1.20	12.0
Pioche	54	− 2	28.8	1.00	5.5
Potts	54	−11	29.8	0.29	3.0
Reno State University	60	16	38.0	0.12	
San Jacinto	53	− 2	27.9	0.40	4.0
Sodaville	65	15	40.0	0.07	.....
Tecoma	54	− 8	25.0	0.20	2.0
Wadsworth	72	12	44.7	.....	.....
Wells *[1]	47	6	28.2	0.30	1.5
Wood	53	1	28.8	0.83	
New Hampshire.					
Alstead	45	−13	15.9	4.40	30.0
Berlin Mills	42	−33	11.8	2.92	28.0
Bethlehem	47	−15	12.6	2.59	22.0
Brookline *[1]	46	−20	19.8	5.53	33.0
Chatham	48	−24	13.2	2.15	20.0
Durham	47	−17	18.8	7.60	.....
Franklin Falls	46	−21	17.2	3.21	24.5
Grafton	47	−28	13.2	3.40	25.0
Hanover	48	−24	13.6	1.90	16.8
Keene	50	−20	16.8	3.45	30.0
Littleton	42	−16	12.2	2.66	22.0
Nashua	48	−16	19.6	4.99	25.5
Newton	48	−10	18.8	4.85	26.5
North Woodstock	.....	.....	.....	1.51	.....
Plymouth	44	−20	15.6	3.30	27.0
Stratford	47	−30	12.2	2.05	21.0
New Jersey.					
Asbury Park	56	0	29.0	4.91	22.6
Bayonne	51	1	26.9	4.17	23.7
Belvidere	57	− 7	23.9	5.95	30.5
Bergen Point	53	− 1	26.4	3.65	21.7
Beverly	58	1	27.9	3.26	11.6
Blairstown	52	−10	23.6	4.89	34.8
Bridgeton	60	0	29.8	3.28	13.5
Cape May C. H.	59	4	30.6	3.80	22.5
Charlotteburg	53	−13	23.2	7.13	.....
Clayton	57[c]	− 3[c]	27.3[c]	3.02	22.0
College Farm	53	− 1	26.8	3.80	.....
Dover	51	− 6	22.4	6.46	31.6
Elizabeth	52	2	27.8	3.80	.....
Englewood	53	− 3	26.4	4.17	22.0
Flemington	56	− 4	28.1	3.37	9.0
Friesburg	60	− 1	28.8	3.24	13.4
Hightstown	52	− 2	27.5	4.78	19.5
Imlaystown	56	0	27.7	2.58	12.2
Indian Mills	58	0	28.4	3.54	14.6
Lakewood	59	0	28.4	3.88	20.5
Lambertville	56	− 2	27.2	3.60	18.5
Layton	51	−16	20.8	5.50	27.5
Moorestown	54	0	27.7	2.87	10.9
Newark	53	− 1	26.6	3.67	15.2
New Brunswick	53	0	27.1	3.75	15.3
Newton	54	−12	23.0	6.05	35.0
Oceanic	54	0	28.0	3.52	13.7
Paterson	54	2	27.8	5.03	22.4
Phillipsburg	54	− 2	25.0	4.64	24.5
Plainfield	52	0	25.8	4.23	18.3
Pleasantville	.....	.....	.....	3.86	18.0
Rancocas	.....	.....	.....	3.05	9.7
Rivervale	50	−15	23.4	5.31	34.0
Sandyhook	49	0	27.2	3.21	22.0
Somerville	55[c]	− 1[c]	25.6[c]	4.65	19.5
South Orange	52	− 1	25.6	4.24	21.5
Sussex	53	−12	23.6	6.59	40.5
Trenton	58	1	31.3	2.68	16.0
Tuckerton	57	− 1	28.9	4.56	18.5
Vineland	57	− 3	28.2	3.64	16.2
Woodbine	58	3	29.6	2.85	20.5
Woodstown	.....	.....	.....	3.57	17.0
New Mexico.					
Alamagordo	71	20	44.4	1.02	
Albert	67	− 4	35.0	0.70	7.0
Albuquerque	57	15	32.6	1.00	6.0
Alma	71	14	40.6	1.44	.....
Arbela	67	15	39.6	0.60	6.0
Bellranch	72	− 3	37.3	0.50	5.0
Bloomfield	54	6	30.3	0.59	4.8
Brice	71	23	44.9	0.97	
Cambray	.....	.....	.....	1.69	
Carlsbad	80	20	45.0	0.92	
Cimarron	64	− 6	30.2	0.26	2.5
Cloudcroft	46	7	29.5	3.20	9.5
Deming	66	12	41.0	1.53	
Dorsey	61	− 3	30.4	0.35	5.0
Eagle Rock Ranch	55	− 6	29.6	0.82	8.7
Elizabethtown	44	−12	20.2	1.90	20.5
Elk	70	18	41.1	0.91	6.0
Engle	66	11	39.4	1.20	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Mexico—Cont'd.	°	°	°	Ins.	Ins.
Estancia	56	−6	25.8	1.00	9.0
Fairview	76	12	41.3	0.85	T.
Fort Bayard	64	17	40.8	3.07	2.0
Fort Stanton	63	12	36.8	0.40	4.0
Fort Union	67	−9	34.4	1.00	10.0
Fort Wingate	54	8	31.0	2.30	24.0
Fruitland	48	7	30.5	0.56	2.5
Hillsboro	63	......		1.67	
Las Vegas	57	−9	30.6	1.45	13.5
Lordsburg	75	19	44.8	1.57	
Los Lunas	59	17	35.9	1.25	
Luna	55	3	30.2	2.00	21.5
Mesilla Park	72	16	43.8	1.01	
Mineral Hill	......	......	......	1.43	14.0
Mountainair	56	4	32.5	0.72	10.0
Raton	54	2	30.8	0.40	4.0
Rociada	57	1	34.2	1.56	20.0
San Marcial	66	19	39.6	2.00	T.
San Rafael	60	8	33.2	0.79	9.0
Socorro	63	15	36.7	1.05	T.
Springer	58	−16	27.4	0.37	5.0
Strauss	......	......	......	0.63	
Taos	54	−9	25.4	1.16	17.0
Tucumcari	67	−3	36.6	0.53	6.0
Vermejo	57	−9	27.5	0.77	10.5
New York.					
Adams	......	......	......	5.59	48.0
Addison	54	−16	20.8	2.60	20.6
Akron				3.02	......
Alden	46	−4	18.6	4.45	35.4
Ames	48	−11	19.4	2.15	14.0
Amsterdam	46	−12	20.2	4.33	24.5
Appleton	46	2	20.7	2.13	......
Arcade	45	−22	13.2	5.60	58.3
Athens	48	−3	21.6	2.44	20.6
Atlanta	50	−22	18.4	2.65	28.5
Atwater	......	......	......	2.42	17.1
Auburn	47	−3	20.0	2.53	14.0
Avon	49	−8	18.2	2.27	28.0
Baldwinsville	43	−7	19.1	2.43	21.6
Ballston Lake	49	−10	17.6	3.25	15.4
Bedford	50	−1	26.8	5.12	15.0
Berlin	52	−15	17.6	3.91	33.0
Blue Mountain Lake	......	......	......	4.85	37.5
Bolivar	45	−20	17.8	3.07	28.0
Bouckville	42	−15	15.7	3.63	22.5
Brockport	46	−1	20.5	4.05	34.5
Cape Vincent	38	−15	12.2	3.35	......
Carmel	52	−9	21.1	6.30	27.0
Carvers Falls	50	−21	14.5	1.32	16.0
Chatham	50	−7	19.8	3.11	27.5
Chazy	46	−16	12.2	1.30	14.0
Coeymans	49	−5	20.4	2.52	......
Cooperstown	45	−13	16.4	3.11	16.5
Cortland	47	−9	17.8	3.26	12.3
Cutchogue	52	4	26.9	2.90	14.0
Dekalb Junction	50	−21	12.4	2.33	19.5
De Ruyter	38[d]	−15	16.2[b]	2.74	19.8
Easton	......	......	......	1.81	15.0
Elba	44	−2	17.9	5.60	47.0
Elmira	56	−5	22.6	1.39	......
Faust	47	−27	10.8	3.02	32.5
Fayetteville	48	−16	18.7	2.14	13.5
Fort Plain	45	−8	21.2	2.79	15.3
Franklinville	48	−18	17.0	5.05	38.0
Gabriels	47	−29	9.4	2.82	26.2
Gansevoort	......	......	......	3.25	24.5
Glens Falls	52	−14	17.0	2.66	20.4
Gloversville	44	−11	16.1	4.87	34.8
Greenfield	49	−11	16.6	4.55	24.0
Greenwich	52	−11	17.0	2.38	15.5
Griffin Corners	46	−16	17.1	3.83	16.3
Harkness	50	−11	14.2	1.64	16.9
Haskinville	......	......	......	2.58	24.6
Hemlock	48	−3	19.6	2.20	26.0
Hunt	47	−15	17.8	3.78	28.0
Indian Lake	46	−23	13.9	1.92	11.5
Ithaca	50	−3	20.0	2.82	16.9
Jamestown	51	−10	19.2	3.59	30.6
Jeffersonville	50	−18	18.0	2.76	20.5
Keene Valley	49	−15	13.9	2.92	13.8
Lake George	47	−12	16.6	2.55	16.2
Le Roy	45	0	19.1	4.04	37.1
Liberty	45	−15	16.6	5.77	25.8
Littlefalls, City Res.	47	−14	17.4	2.73	22.2
Lockport	43	1	20.0	3.09	......
Lowville	43	−15	13.3	3.41	43.8
Lyndonville	......	......	......	1.94	13.0
Lyons	45	−2	19.8	3.05	30.5
Middletown	48	−5	22.6	4.86	27.4
Mohonk Lake	50	−6	20.3	4.60	35.5
Moira	44	−15	10.2	2.70	20.0
Mt. Hope	54	−8	24.3	5.66	26.0
Newark Valley	......	......	......	2.09	19.0
New Lisbon	46	−17	15.3	2.84	20.0
North Hammond	40	−16	11.0	1.20	......
Ogdensburg	48	−16	13.0	1.14	8.6
Old Chatham	......	......	......	3.02	22.0

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	Ins.	Ins.
Oneonta	46	−11	19.2	2.90	13.5
Otto	54	−4	18.0	2.11	......
Oxford	47	−14	18.2	3.23	26.3
Oyster Bay	53	1	27.8	4.89	15.0
Palermo	......	......	......	2.63	21.9
Perry City	49	−10	18.1	3.38	24.5
Plattsburg Barracks	50	−10	15.6	1.99	19.9
Port Jervis	52	−8	21.5	5.26	31.7
Potsdam	46	−18	10.8	2.40	25.0
Redhook	......	......	......	4.80	
Richland	44	−18	16.4	2.10	21.0
Richmondville	49	−13	17.7	2.64	17.5
Ridgeway	44	1	20.0	3.11	25.4
Ripley	50	−5	21.6	4.70	48.0
Rome	41	−10	17.6	2.53	20.0
Romulus	52	0	21.2	2.59	17.0
Saranac	49	−21	11.8	2.13	......
Scarsdale	50	−4	23.9	6.31	35.5
Setauket	52	2	26.8	3.10	6.5
Shortsville	46	−4	18.8	1.85	18.5
Skaneateles	......	......	......	2.30	......
Southampton	52	4	27.2	4.75	20.1
South Butler	......	......	......	4.95	47.5
South Canisteo	49	−15	17.8	3.80	34.0
South Kortright	49	−20	17.9	2.89	14.4
South Schroon	48	−15	14.2	2.87	22.9
Spier Falls	48	−14	16.7	2.82	16.0
Ticonderoga	44	−18	16.4	1.25	13.0
Volusia	45	−7	18.1	2.64	25.4
Wappinger Falls	50	−23	20.7	6.10	38.0
Warwick	......	......	......	4.56	35.0
Watertown	45	−15	15.3	2.61	27.0
Waverly	56	−13	21.2	2.72	15.2
Wedgwood	48	−5	17.6	3.12	22.5
Wells	45	−23	15.6	3.32	30.1
West Berne	48	−17	18.8	3.53	27.0
Westfield	49	−5	20.6	2.59	24.0
Windham	48	−18	19.0	3.95	22.5
North Carolina.					
Brevard	60	2	32.0	5.49	2.0
Brewers	69	4	33.8	3.03	5.0
Bryson City	......	......	......	4.32	8.1
Catawba	......	......	......	2.80	2.4
Chapelhill	67	11	36.4	2.79	
Currituck	......	......	......	2.44	
Eagletown	61	13	34.9	2.72	0.8
Edenton	66	14	37.2	3.70	2.0
Enoree	......	......	......	2.22	
Fayetteville	71	12	40.2	2.44	T.
Goldsboro	72	14	38.1	1.99	T.
Graham	......	......	......	3.37	2.4
Greensboro	69	10	36.2	2.67	1.5
Henderson	60	13	34.8	2.14	1.5
Hendersonville	63	2	34.2	5.20	3.0
Henrietta	70	7	36.9	3.49	0.5
Horse Cove	65	−3	33.2	6.53	5.4
Hot Springs	60	4	34.6	......	.0
Jefferson	56	−4	29.2	2.61	11.9
Kinston	76	11	40.2	0.85	T.
Lenoir	69	6	34.3	3.50	3.0
Lexington	68	6	34.4	2.65	2.0
Lincolnton	70	8	36.6	......	
Linville	52	−8	27.3	4.06	12.0
Littleton	69	10	33.9	1.56	1.5
Louisburg	65	10	36.2	2.32	1.0
Lumberton	73	11	38.8	1.96	
Manteo	67	14	39.4	3.12	T.
Marion	67	7	36.2	4.25	4.5
Marshall	59	1	33.0	1.24	11.7
Moncure	69	8	36.4	3.99	T.
Monroe	68	8	37.4	1.69	
Morganton	67	6	34.4	4.38	9.5
Mount Holly	......	......	......	2.66	T.
Murphy	......	......	......	3.99	13.2
Nashville	69	11	37.2	1.90	0.1
Newbern	71	12	40.6	3.10	T.
Patterson*[b]	60	8	29.6	3.15	4.8
Pinehurst	69	13	39.2	2.11	
Pittsboro	71	6	36.6	2.41	
Reidsville	68	9	34.2	3.14	4.5
Rockingham	69[c]	4[c]	35.5[c]	1.59	T.
Rocky Mount	......	......	......	2.27	0.1
Salem	67	9	33.6	3.04	1.0
Salisbury	69	10	34.6[c]	2.98	1.8
Saxon	65	6	34.0	2.98	2.5
Scotland Neck	67	16	38.2	3.03	1.0
Selma	72	......	......	3.30	T.
Settle	68	1	37.4	2.96	2.0
Sloan	74	12	40.9	2.72	
Soapstone Mount[g]	66	14	36.8	3.36	T.
Southern Pines	69	13	39.9	2.58	T.
Southport	64	13	43.6	2.05	
Statesville	70	6	34.2	2.88	2.0
Tarboro	71	13	38.2	3.21	1.3
Washington	73	12	41.0	2.85	0.5
Weldon[a]	69	13	35.4	2.41	2.9
Whiteville	76	10	41.8	2.16	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
North Dakota.	°	°	°	Ins.	Ins.
Amenia	35	−26	2.0	0.15	1.5
Ashley	42	−36	0.8	0.30	3.0
Berlin	35	−35	2.4	0.19	1.9
Bottineau	30	−31	−2.7	T.	T.
Cando	32	−35	−3.8	0.12	1.2
Churchs Ferry	30	−32	−4.3	0.15	1.5
Coalharbor	36	−29	0.8	0.29	2.9
Cooperstown	32	−32	−1.0	0.10	1.0
Dickinson	42	−26	5.1	0.23	2.5
Donnybrook	32	−30	0.2	0.35	3.5
Dunseith	31	−36	−2.0	0.30	3.0
Edgeley	40	−28	4.8	0.15	1.5
Ellendale	48	−29	6.0	0.20	2.0
Fargo	35	−30	0.1	0.08	0.8
Forman	40	−32	3.8	T.	T.
Fort Berthold	41	−34	3.5	0.30	3.0
Fort Yates	34	−30	6.6	0.15	2.5
Fullerton	38	−32	4.0	0.13	1.3
Glenullin	39	−24	6.0	0.55	4.7
Grafton	34	−28	0.3	T.	T.
Hamilton	35	−33	−1.2	0.71	7.1
Jamestown	33	−32	0.4	0.40	4.0
Kulm	44	−31	3.8	0.28	3.0
Langdon	32	−32	−1.3	......	......
Larimore	35	−31	1.3	0.25	2.5
Lisbon	36	−30	4.0	0.10	1.0
McKinney	34	−36	−0.6	0.05	0.5
Manfred	39	−29	0.2	0.66	6.6
Mayville	37	−31	2.1	0.16	1.6
Medora	......	......	......	0.70	7.0
Melville	32	−25	1.0	0.30	3.0
Milton	32	−32	0.0	......	......
Minnewaukon	36	−31	0.9	0.00	
Minto	34	−34	−3.9	0.38	3.8
Oakdale	47	−24	6.9	0.65	6.5
Palermo	......	......	......	0.40	4.0
Park River	35	−32	0.8	0.35	3.5
Pembina	34	−36	−5.5	0.68	6.8
Portal	34	−29	0.4	0.20	2.0
Power	38	−33	0.8	0.45	4.5
Rolla	35	−29	0.0	0.45	3.8
Rugby	30	−36	−5.0	0.50	5.0
Sentinel Butte	48	−27	7.8	0.70	7.0
University	36	−26	2.8	0.29	3.0
Wahpeton	39	−20	6.3	0.32	3.2
Walhalla	36	−40	0.0	......	......
Westhope	30	−35	−2.0	0.50	3.5
Willow City	30	−36	−5.4	T.	T.
Wishek	36	−33	0.8	0.20	2.0
Ohio.					
Akron	55	−5	20.1	2.04	15.0
Amesville	61	−10	24.8	1.65	12.4
Atwater	......	......	......	1.60	13.0
Bangorville	56	−7	21.1	1.80	9.1
Bellefontaine	54	−11	20.7	1.88	7.9
Benton Ridge	55	−4	22.4	1.58	9.5
Bowling Green	57	−4	21.1	1.78	9.8
Bucyrus	54	−8	21.7	1.42	1.5
Cadiz	56	−3	22.8	2.22	16.9
Cambridge	62	−11	24.0	1.66	9.0
Camp Dennison	57	−9	24.0	1.67	10.8
Canal Dover	54	−10	22.2	2.03	10.0
Canton	54	−6	22.5	1.80	13.5
Cardington	55	−12	20.8	1.56	10.3
Circleville	58	−1	24.9	1.28	4.5
Clarington	61	−5	26.6	2.25	19.2
Clarksville	57	−6	24.2	1.23	8.8
Cleveland[a]	56	−2	23.7	1.84	14.6
Cleveland[b]	56	−3	22.2	1.88	18.1
Clifton	56	−8	23.2	1.20	6.7
Coalton	64	−8	25.0	1.81	12.5
Colebrook	50	−5	20.4	0.57	3.0
Dayton[b]	58	−6	24.4	1.63	9.5
Defiance	58	−6	21.0	1.60	8.3
Delaware	57	−10	22.2	1.80	10.4
Demos	57	−2	23.9	1.92	7.0
Findlay	59	−2	21.6	1.64	4.5
Frankfort	57	−2	26.0	1.30	9.0
Fremont	57	−2	22.8	1.85	8.7
Garrettsville	56	−11	20.6	2.00	11.9
Granville	52	−7	23.2	1.50	12.1
Gratiot	55	−8	23.5	1.91	12.8
Green	58	−2	25.4	2.57	15.0
Greenfield	55	0	25.1	1.29	11.0
Greenhill	47	−17	19.8	1.87	13.8
Greenville	55	−5	22.0	1.90	8.5
Hedges	56	−8	23.2	1.45	5.0
Hillhouse	56	−11	19.8	2.00	11.0
Hiram	53	−2	20.4	1.60	9.5
Ironton	59	1	27.7	2.89	10.0
Jacksonburg	58	−2	24.1	2.32	15.3
Kenton	60	−12	20.2	1.67	5.2
Killbuck	......	......	......	2.17	10.9
Lancaster	65	−5	24.2	1.48	7.0
Lima	46	−5	21.8	2.60	10.5
McConnelsville	60	−7	24.2	1.67	11.4
Manara	57	−1	23.9	1.30	6.0
Mansfield	......	......	......	1.60	11.5

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Ohio—Cont'd.					
Marietta	58	−3	24.0	1.71	5.7
Marion	58	−6	22.1	2.56	13.9
Medina	58	−16	20.2	1.66	7.0
Milfordton	56	−8	21.2	1.78	13.0
Milligan	59	−11	24.2	1.62	10.0
Millport	54	−16	20.6	1.67	14.8
Montpelier	53	−8	19.2	1.51	6.0
Napoleon	49	−4	22.4	0.78	1.9
Nellie	52	−5	23.2	1.68	22.4
New Alexandria	59	−9	22.2	2.55	7.0
New Berlin	55	−10	21.8	1.63	6.5
New Bremen	55	−9	21.7	1.82	11.3
New Richmond	59	−5	25.4	1.44	5.0
New Waterford	53	−14	21.4	1.25	11.0
North Lewisburg	54	−8	21.7	2.30	18.1
North Royalton	56	−6	21.0	1.64	14.0
Norwalk	59	−7	22.3	2.08	11.0
Oberlin	58	−11	21.8	1.64	.....
Ohio State University	55	−4	22.7	1.25	7.8
Orangeville	55	−15	20.2	1.62	8.0
Ottawa	55	−5	21.1	1.76	20.5
Pataskala	56	−8	22.8	1.80	12.4
Philo	60	−3	24.4	1.24	15.3
Plattsburg	57	−7	22.8	1.94	13.0
Pomeroy	58	1	25.8	1.67	14.6
Portsmouth *b*	61	1	26.8	2.43	14.0
Pulse	59	−4	24.2	1.79	15.0
Rittman	58	−11	21.2	1.51	6.0
Rockyridge	58	−5	21.3	1.82	5.6
Shenandoah	55	−9	20.6	1.42	4.7
Sidney	56	−5	22.6	1.82	9.9
Somerset	57	−1	24.0	1.86	21.4
South Lorain	59	−11	22.7	2.91	10.6
Springfield	.....	.....	.....	1.42	7.0
Tiffin	55	−1	22.4	1.83	8.7
Upper Sandusky	56	−5	22.2	1.43	8.1
Urbana	53	−10	21.2	1.20	12.2
Vickery	57	−5	21.8	1.58	3.3
Warren	55	−6	22.0	1.84	12.0
Wauseon	56	−7	19.2	1.66	11.7
Waverly	63	−2	25.2	1.83	11.3
Waynesville	56	−6	23.2	1.01	13.5
Wellington	56	−10	22.4	1.53	6.5
Willoughby	.....	.....	.....	1.29	5.5
Wilson	61	−7	24.8	2.14	12.5
Wooster	59	−8	22.6	1.83	10.0
Zanesville	.....	.....	.....	1.70	9.0
Oklahoma.					
Alva	60	−10	30.0	1.10	10.5
Arapaho	69	−8	28.4	1.55	6.0
Beaver	60	−13	25.9	0.60	6.0
Binger	66	−10	28.6	1.65	4.0
Blackburn	53	−7	29.9	5.66	4.5
Busch	65	−7	29.1	.....	.....
Chandler	68	−2	29.2	2.22	3.5
Cleo	71[b]	−16[c]	29.4[c]	0.50	5.0
Cloud Chief	65	−5	32.4	0.70	4.0
Enid	63	−14	25.5	2.95	6.0
Erick	69	−5	30.7	2.00	2.0
Fort Reno	63	−6	27.2	2.92	24.5
Fort Sill	67	0	31.2	2.00	2.0
Frederick	70	1	35.5	1.50	0.5
Gage	68	−20	26.6	1.15	9.0
Grand	66	−10	28.0	1.20	7.0
Guthrie	61	−5	27.9	1.67	3.0
Harrington	68	−7	28.5	1.10	6.0
Hennessey	63	−10	26.6	2.06	6.0
Hobart	68	−2	31.2	1.45	3.0
Jefferson	55	−13	23.4	0.60	6.0
Jenkins	68	−10	26.8	1.58	6.0
Kenton	65	−20	30.4	0.60	6.0
Kingfisher	63	−8	28.6	1.80	4.5
McComb	68	−1	30.6	0.81	T.
Mangum	68	2	32.8	2.00	4.0
Meeker	69	0	29.7	2.13	T.
Newkirk	59	−12	25.5	1.50	6.0
Norman	67	−3	30.2	2.02	.....
Okeene	68	−11	27.6	1.88	5.0
Perry	61	−8	26.1	1.50	5.5
Shawnee	71	0	31.4	1.51	1.8
Stillwater	64	−6	26.0	1.79	4.0
Taloga	64	−13	25.6	0.70	7.0
Temple	69	1	34.2	1.56	.....
Waukomis	68	−10	29.0	1.30	6.5
Weatherford	64	−7	27.4	1.49	2.6
Whiteagle	62	−12	25.6	1.24	7.0
Woodward	.....	.....	.....	0.60	6.0
Oregon.					
Albany	.....	.....	.....	4.55	2.0
Alpha	62	18	41.1	7.85	
Arlington	55	14	34.0	2.54	7.0
Ashland	62	18	42.2	0.73	
Astoria	57	29	42.4	9.22	2.6
Aurora (near)	55	21	39.7	3.89	1.2
Bay City	57	25	43.4	8.87	1.0
Bend	52	−6	30.8	2.83	17.8
Beulah	45	−5	24.6	0.95	9.5
Blackbutte	54	22	40.8	3.65	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Oregon—Cont'd.					
Blalock	55	16	35.4	1.73	6.5
Bullrun	.....	.....	.....	5.89	6.0
Burns	49	−4	28.2	1.94	23.0
Butter Creek	.....	.....	.....	1.29	4.0
Cascade Locks	51	22	36.8	5.66	5.0
Coquille	.....	.....	.....	8.19	
Corvallis	59	19	40.2	4.97	1.5
Dayville	61	10	36.4	1.90	2.2
Doraville	51	18	36.8	3.60	5.5
Drain	63	21	42.1	3.87	
Ella	.....	.....	.....	2.29	5.0
Eugene	57	23	39.5	3.62	T.
Fairview	66	22	46.2	7.18	
Falls City	55	20	37.6	10.34	7.0
Forestgrove	59	20	38.0	3.57	9.0
Gardiner	62	27	43.1	7.48	
Glendale	65	24	42.0	4.65	
Glenora	50	19	36.0	12.66	10.0
Gold Beach	62	31	48.8	12.87	.....
Government Camp	47	5	29.7	4.86	26.0
Grants Pass	71	19	41.6	4.30	
Grass Valley	44	−8	28.0	0.76	6.5
Hood River	53	17	34.8	4.32	29.0
Huntington	49	10	29.8	2.65	14.0
Jacksonville	60	19	41.6	1.59	
John Day	65	9	34.6	0.88	2.5
Joseph	52	0	26.4	0.18	0.5
Kerby	65	19	41.8	10.16	
Klamath Falls	53[i]	8[i]	36.0[i]	1.60	T.
Lagrande	52	2	33.6	1.32	2.0
Lakeview	47	9	31.1	1.67	1.0
Lonerock	60	−2	31.4	1.27	10.5
McKenzie Bridge	56	15	38.4	5.24	2.5
McMinnville	55	25	40.8	5.40	7.0
Marshfield	65	25	46.7	7.47	
Meacham	.....	.....	.....	1.25	4.2
Monroe	61	19	40.2	5.31	4.5
Mount Angel	58	22	40.4	4.33	1.5
Nehalem	.....	.....	.....	8.88	5.5
Newport	60	28	45.3	5.44	T.
Ontario	.....	.....	.....	1.07	12.5
Paisley	56	10	36.7	.....	.....
Pendleton	58	15	33.8	1.38	2.8
Pine	44	−10	24.2	2.63	8.0
Prineville	53	2	30.6	1.87	T.
Riverside	50	−2	27.6	2.10	21.0
Salem	56	22	40.5	4.71	3.0
Sparta	45	4	27.8	1.79	15.0
Stafford	55	24	39.4	4.41	1.0
The Dalles	54	21	35.5	3.27	17.8
Toledo	62	24	43.7	6.68	T.
Umatilla	56	11	34.8	1.31	2.5
Vale	46	−4	27.5	3.31	13.0
Wallowa	48	−1	26.8	1.05	4.7
Wamic	51	−1	29.0	1.95	23.0
Warm Spring	55	6	32.7	2.01	13.7
Weston	58	6	31.0	1.73	1.8
Williams	72	17	44.4	2.59	
Pennsylvania.					
Aleppo	59	−15	24.1	3.48	23.0
Altoona	59	−9	22.2	3.23	.....
Beaver Dam	.....	.....	.....	2.47	.....
Bellefonte	55	−1	25.0	3.42	13.5
Brookville	.....	.....	.....	3.24	27.0
Browers	.....	.....	.....	4.50	.....
California	61	−5	26.2	2.50	19.0
Cassandra	56	−14	21.4	2.97	27.0
Centerhall	55	−5	20.4	2.07	17.3
Clarion	.....	.....	.....	3.30	26.8
Claysville	69	−12	24.7	2.68	17.5
Clearfield	.....	.....	.....	2.70	17.2
Coatsville	55	−4	26.2	7.25	40.4
Confluence	.....	.....	.....	3.94	.....
Coudersport	48	−15	18.8	.....	20.0
Davis Island Dam	.....	.....	.....	1.89	.....
Derry	58	−15	24.3	3.54	29.5
Doylestown	.....	.....	.....	4.21	.....
Dushore	53	−14	20.7	4.42	20.6
East Mauch Chunk	57	−3	23.6	5.39	17.5
Easton	50	−1	25.5	4.70	23.2
Ellwood Junction	.....	.....	.....	1.72	6.2
Emporium	52	−10	22.8	3.03	15.8
Ephrata	59	−3	26.0	4.49	20.6
Everett	61	−4	23.3	2.56	10.0
Forks of Neshaminy	.....	.....	.....	3.20	.....
Franklin	55	−18	21.2	2.97	16.0
Freeport	59	−14	23.2	2.79	18.6
Gettysburg	62	−2	27.6	4.37	16.8
Girardville	.....	.....	.....	6.29	3.8
Gordon	55	−14	22.6	7.55	27.0
Grampian	45	−20	18.7	3.00	20.0
Greensboro	.....	.....	.....	2.76	21.5
Greenville	55	−10	21.0	2.89	20.5
Hamburg	57	0	26.4	5.05	22.0
Hanover	61	−2	27.8	4.30	21.8
Herrs Island Dam	.....	.....	.....	2.50	17.2
Huntingdon *b*	61	−8	25.8	3.28	13.0
Indiana	56	−10	21.7	3.37	28.8

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Pennsylvania—Cont'd.					
Irwin	59	−12	25.0	2.90	20.0
Johnstown	60	−12	25.0	4.21	30.0
Keating	.....	.....	.....	3.37	
Kennett Square	63	−3	28.0	3.55	24.7
Lansdale	.....	.....	.....	4.67	.....
Lawrenceville	55	−16	19.7	1.95	19.0
Lebanon	59	−5	25.8	4.85	22.6
Leroy	51	−6	19.7	4.05	16.0
Lewisburg	59	−8	24.8	4.50	19.5
Lockhaven *a*	57	−6	24.6	3.42	14.5
Lock No. 4	.....	.....	.....	2.28	
Lycippus	56	−6	23.8	4.58	38.4
Marion	59	−6	26.1	4.37	24.0
Mifflin	.....	.....	.....	3.90	18.2
Mifflintown	59	−3	25.4	3.66	15.8
Milford	55	−7	21.8	.....	
Montrose	50	−8	18.8	3.05	.....
New Germantown	63	−3	26.4	3.98	16.2
Oil City	.....	.....	.....	3.46	22.0
Ottsville	.....	.....	.....	4.76	
Parker	.....	.....	.....	2.92	22.5
Philadelphia	58	5	30.4	3.63	12.0
Pocono Lake	50	−12	20.8	4.08	29.0
Point Pleasant	.....	.....	.....	3.94	.....
Pottsville	.....	.....	.....	5.21	
Quakertown	56	−6	26.6	5.42	27.3
Reading	58	−6	26.9	4.80	26.1
Saegerstown	59	−11	21.7	2.14	15.5
St. Marys *d*	49	−8	19.2	2.50	21.0
Saltsburg	.....	.....	.....	3.20	28.0
Seisholtzville	.....	.....	.....	5.03	.....
Selinsgrove	61	−7	24.8	4.29	19.0
Shawmont	.....	.....	.....	2.99	12.0
Skidmore	57[e]	−15[e]	20.8[e]	2.46	12.0
Smethport *e*	51	−21	18.3	3.42	.....
Smiths Corners	.....	.....	.....	4.32	
Somerset	52	−18	19.8	4.80	34.9
South Eaton	55	−5	22.9	3.52	26.0
Springmount	.....	.....	.....	4.86	
State College	49	−5	22.2	3.19	16.2
Swarthmore	58	0	28.2	.....	
Towanda	54	−11	21.0	2.62	13.6
Uniontown	60	−8	24.7	3.64	29.3
Warren	52	−5	20.8	3.47	29.2
Wellsboro	51	−8	21.3	.....	16.9
Westchester	57	0	27.2	5.00	19.2
West Newton	.....	.....	.....	2.90	20.0
Wilkesbarre	52	−3	24.4	4.57	28.0
Williamsport	53	−2	24.8	4.55	10.8
Rhode Island.					
Bristol	48	7	26.2	3.28	16.5
Kingston	49	−1	23.9	4.37	13.0
Narragansett	51	0	25.8	2.96	9.5
Pawtuckett	50	2	29.6	1.98	8.0
Providence *a*	49	7	26.4	4.66	21.5
South Carolina.					
Aiken	69	10	41.8	2.00	
Allendale	56	.....	.....	1.00	
Anderson	.....	.....	.....	2.22	
Barksdale	62	9	38.1	2.12	T.
Batesburg	66	12	40.0	2.02	T.
Beaufort	70	17	47.3	1.84	
Blackville	71	14	41.8	1.19	
Bowman	74	14	43.8	1.50	T.
Calhoun Falls	.....	.....	.....	3.60	
Cheraw *a*	71	13	39.0	1.31	
Clarks Hill	68	12	41.8	1.57	
Clemson College	55	16	35.4	3.62	
Conway	76	12	41.4	2.65	
Dillon	74	10	41.6	1.40	T.
Duewest	63	11	40.1	2.36	
Edisto	.....	.....	.....	3.90	
Effingham	.....	.....	.....	1.30	
Florence	75	15	40.3	1.71	T.
Gaffney	70	9	36.8	2.88	1.0
Georgetown	74	18	43.8	1.80	T.
Greenville	65	8	33.6	4.09	1.0
Greenwood	64	13	37.3	1.55	
Heath Springs	66	11	36.8	1.87	T.
Kingstree *a*	73	16	45.6	1.20	
Liberty	65	9	37.3	4.20	0.5
Little Mountain	68	12	40.4	1.48	T.
Lugoff	68	10	40.2	1.70	T.
Newberry	67	12	39.2	1.47	T.
Pelzer	.....	.....	.....	2.67	0.3
Pinopolis *[1]	72	16	43.0	1.65	
St. George	72	14	41.0	0.30	
St. Matthews	71	13	41.0	1.92	
Saluda	68	11	39.0	1.60	
Santuck[1]	57	10	37.6	0.86	
Seivern	74	11	40.0	1.66	T.
Smiths Mills	.....	.....	.....	2.60	
Society Hill	63	15	39.7	2.13	
Spartanburg	70	10	36.6	2.78	0.4
Statesburg	73	14	43.6	1.63	T.
Summerville	74	14	43.8	1.55	0.1
Trenton	65	10	41.4	1.75	
Trial	70	10	42.5	2.42	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
South Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Walhalla	72	9	39.0	4.84	T.
Walterboro	77	14	46.4	1.59	
Winnsboro	65	12	39.6	2.30	
Winthrop College	66	10	38.2	2.03	T.
Yemassee	76	14	43.6	1.83	
Yorkville	69	12	38.9	2.06	T.
South Dakota.					
Aberdeen	45	−30	6.6	0.35	.....
Academy	48	−22	12.4	0.57	6.5
Alexandria	43	−30	9.0	0.85	6.5
Armour	46	−31	10.8	0.74	7.4
Ashcroft	45	−22	12.0	0.70	7.0
Bowdle	44	−24	7.0	0.45	4.5
Brookings	38	−30	5.6	0.22	
Canton	53	−34	8.8	.....	
Cavite	52	−29	11.2	0.68	.....
Centerville	.....	.....	.....	1.52	15.5
Chamberlain	43	−23	11.2	0.63	8.8
Cheyenne	50	−26	10.8	0.50	4.0
Clark	46	−33	5.4	0.68	7.0
Clear Lake	40	−24	6.6	0.13	.....
DeSmet	41	−28	9.2	0.70	7.0
Doland	38	−34	5.0	0.31	4.4
Elkpoint	58	−30	11.0	1.40	16.0
Fairfax	62	−22	14.8	0.79	12.0
Farmingdale	.....	.....	.....	0.45	5.0
Faulkton	42	−26	8.0	0.28	5.5
Flandreau	37	−28	5.8	0.59	6.0
Forestburg	43	−33	6.6	0.59	5.9
Fort Meade	57	−13	18.2	0.97	.....
Gannvalley	39	−28	9.4	0.55	6.0
Grand River School	47	−31	7.7	0.14	2.7
Greenwood	52	−27	14.1	1.23	12.3
Herreid	44	−35	3.7	0.03	0.3
Highmore	43	−25	9.0	0.60	6.0
Hotch City	58	−25	10.4	0.23	8.0
Howard	41	−31	7.4	0.30	4.5
Howell	41	−26	7.0	0.22	2.3
Ipswich	45	−29	5.4	.....	
Kidder	46	−36	2.8	.....	
Kimball	46	−29	8.0	0.25	1.7
Leola	42	−26	6.3	0.35	2.5
Leslie	60	−19	13.8	0.40	4.0
Marion	46	−32	8.6	0.90	16.0
Menno	49	−32	9.8	0.55	7.7
Mil'bank	40	−26	4.6	0.60	5.2
Mitchell	42	−29	9.3	0.81	7.5
Oelrichs	50	−24	16.1	0.90	9.0
On-the-Trees Camp	52	−23	10.8	0.28	3.7
Pine Ridge	52	−28	15.9	0.36	9.5
Ramsey	43	−37	6.8	0.58	6.5
Redfield	41	−30	4.6	0.21	2.5
Silver City	.....	.....	.....	0.70	7.0
Sioux Falls	44	−28	8.6	0.66	9.0
Sisseton Agency	38	−25	6.8	0.25	2.5
Spearfish	52	−10	20.0	1.62	18.0
Stephan	40	−29	7.9	0.66	7.0
Tyndall	50	−26	10.6	0.62	.....
Vermillion	50	−27	11.2	0.85	10.0
Watertown	33	−29	4.9	0.75	.....
Wentworth	30	−27	7.0	0.49	.....
Wolsey	.....	.....	.....	0.44	4.5
Tennessee.					
Andersonville	60	2	30.2	2.65	11.5
Ashwood	65	− 2	32.0	4.15	6.5
Benton	66	3	33.2	3.38	1.3
Bluff City	.....	.....	.....	2.36	6.5
Bolivar	65	3	30.3	4.86	7.0
Byrdstown	64	− 5	30.1	3.66	28.2
Carthage	.....	.....	.....	2.14	9.3
Catlettsburg	.....	.....	.....	3.20	8.0
Cedar Hill	66	− 4	29.4	4.05	16.5
Celina	.....	.....	.....	1.93	11.0
Charleston	.....	.....	.....	3.63	1.5
Clarksville	65	− 3	30.0	3.55	16.2
Clinton	.....	.....	.....	2.88	14.0
Covington	63	3	31.5	4.32	4.0
Decatur	65	1	33.2	3.86	5.5
Dickson	66	− 3	30.0	4.95	16.5
Dover	75	− 3	30.8	3.30	16.5
Dyersburg	66	2	30.2	1.92	1.5
Elizabethton	67	2	31.1	2.91	12.3
Florence	63	− 2	31.8	3.87	12.5
Franklin	61	− 3	30.3	3.67	13.5
Greeneville	58	0	31.5	3.04	10.3
Halls Hill	.....	.....	.....	3.25	8.9
Harriman	60	1	31.4	2.55	10.5
Hohenwald	66	2	29.3	4.73	6.8
Iron City	63	1	32.6	5.61	5.5
Isabella	58	0	32.5	4.29	7.2
Jackson	67	1	33.2	3.48	3.0
Johnsonville	68	− 2	31.4	3.50	10.7
Jonesboro	58	1	30.4	2.35	10.5
Kenton	67	0	31.4	3.00	12.5
Kingston	.....	.....	.....	2.13	11.2
Lafayette [e]	65	− 6	29.2	2.44	16.3
Leadvale	.....	.....	.....	2.84	10.0
Lewisburg	65	0	33.0	4.21	8.1

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Tennessee—Cont'd.	°	°	°	*Ins.*	*Ins.*
Liberty	63[e]	− 2[e]	30.4[e]	2.79	9.5
Loudon	.....	.....	.....	3.33	9.0
Lynnville	61	− 1	30.6	3.05	T.
McGee	.....	.....	.....	3.59	10.9
McMinnville	66	− 4	32.6	2.44	14.8
Maryville	65	3	32.8	3.80	13.2
Newport	59	4	31.5	2.95	8.0
Nunnelly	69[f]	2[f]	32.2[f]	3.50	.....
Palmetto	63	− 2	32.6	3.58	4.0
Pope	67	0	33.4	4.61	5.5
Rogersville	62	2	31.1	3.02	4.5
Rotherwood	.....	.....	.....	3.34	8.4
Rugby	66	− 7	28.5	5.60	36.0
Savannah	67	2	34.0	4.24	6.0
Sewanee	61	− 6	30.4	2.30	10.5
Silver Lake	60	− 4	27.3	4.21	27.0
Springdale	61	− 1	29.8	3.55	13.5
Springville	67	− 2	31.0	3.29	13.0
Tazewell	.....	.....	.....	3.46	19.9
Tellico Plains	67	3	35.0	3.42	4.7
Tracy City	60	− 6	30.0	4.77	14.5
Trenton	64	1	33.1	4.58	9.0
Tullahoma	62	− 2	32.1	2.84	5.3
Walling	.....	.....	.....	2.98	7.5
Wildersville	62	3	32.2	3.02	5.8
Yukon	63	− 1	33.4	3.80	.....
Texas.					
Albany	78	9	39.1	0.50	
Alvin	.....	.....	.....	3.22	
Arthur	.....	.....	.....	2.66	
Athens	73	12	42.7	2.50	T.
Austin	75	20	49.2	1.66	
Ballinger	71	12	40.6	0.11	
Beaumont	75	23	49.8	6.94	
Beeville	86	26	52.8	0.66	
Bigspring	73	15	41.0	0.45	T.
Blanco	76	17	45.2	0.97	
Boerne	72	18	47.5	.....	
Bonham	70	10	39.1	2.25	
Booth	.....	.....	.....	1.61	
Bowie	73	4	35.9	1.32	
Brazoria	76	25	53.2	3.88	
Brenham	73	21	46.8	1.60	
Brighton	75	29	55.2	0.71	
Burnet	78	15	45.6	1.04	
Channing	68	− 9	31.7	0.70	7.0
Childress	69	3	33.8	0.43	0.5
Clarksville	67	12	36.7	4.40	T.
Claude	65	1	30.4	0.90	9.0
Claytonville	73	8	38.8	0.21	
Coleman	77	11	43.6	0.25	
College Station	76	20	48.8	0.22	
Colorado	74	10	41.0	0.30	
Columbia	75[d]	25[e]	52.0[e]	3.98	
Columbus	.....	.....	.....	1.30	
Comanche	73	9	41.2	0.92	2.0
Corsicana	74	15	43.0	1.94	
Cotulla	72	20	48.1	0.67	
Crockett	71	18	46.8	2.44	
Cuero	79	24	52.0	1.60	
Dallas	73	12	38.7	3.05	
Danevang	82	22	52.4	1.95	
Decatur	71	7	37.2	0.78	
Dialville	70	17	42.9	3.21	
Duval	82	16	47.3	1.04	
Fort Brown	82	30	59.9	1.61	
Fort Clark	77	20	50.6	0.10	
Fort Davis	71	13	44.4	0.07	T.
Fort McIntosh	85	23	55.8	0.50	
Fort Ringgold	91	16	59.4	0.13	
Fort Stockton	77	14	43.9	T.	
Fredericksburg	75[e]	16[e]	46.0[e]	1.01	
Gainesville	72	8	33.5	1.37	
Gatesville	73	15	44.8	1.65	
Georgetown	77	16	46.3	0.79	
Gonzales	.....	.....	.....	2.01	
Graham	73	9	38.0	0.82	1.0
Grapevine	74	10	40.1	2.23	1.5
Greenville	71	11	40.2	3.39	T.
Hale Center	68	11	39.6	0.27	2.7
Hallettsville	76	24	51.0	2.30	T.
Haskell	79	8	36.9	0.54	
Hearne	77	16	44.8	2.01	
Hempstead	.....	.....	.....	2.10	
Henrietta	61[1]	6[1]	32.6[1]	0.50	
Hereford	58[1]	− 9[1]	29.2[1]	1.00	3.0
Hewitt	.....	.....	.....	1.07	T.
Hillsboro	71	12	41.2	2.42	
Hondo	75	21	51.0	1.35	
Houston	74	24	50.8	2.25	
Huntsville	74	20	45.5	2.29	
Ira	.....	.....	.....	0.52	
Jefferson	71	17	40.9	4.11	
Jewett	70	18	42.8	1.92	
Kaufman	70	13	41.6	3.02	
Kerrville	78	18	48.9	0.65	
Knickerbocker	75	12	43.4	0.20	
Kopperl	.....	.....	.....	3.70	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lampasas	74	15	41.9	0.78	
Lapara	.....	.....	.....	0.60	
Laureles Ranch	.....	.....	.....	0.91	
Liberty	.....	.....	.....	2.60	
Llano	.....	.....	.....	T.	
Longlake	.....	.....	.....	2.92	
Longview	72	18	35.9	4.04	
Luling	77	22	47.6	1.43	
Mann	74	14	43.4	1.34	T.
Marlin	76	14	43.1	1.07	
Menardville	80	10	42.7	0.00	
Mexia	70	16	42.6	1.58	
Mount Blanco	68	6	35.2	1.00	T.
Nacogdoches	74	17	42.8	3.19	
New Braunfels	76	21	49.0	1.77	
Orange	.....	.....	.....	5.20	
Panter	.....	.....	.....	1.11	
Paris	.....	.....	.....	0.55	
Pearsall	80	23	52.4	0.46	
Port Lavaca	74	25	52.0	2.26	
Quanah	71	6	35.2	0.40	4.0
Rhineland	63	5	34.2	0.58	5.8
Riverside	.....	.....	.....	2.53	
Rockisland	75	22	50.8	1.88	
Rockland	73	36	50.4	3.78	
Rockport	68	30	52.8	1.76	
Runge	.....	.....	.....	0.86	
Sabinal	78	21	49.2	1.32	
San Saba	72	14	44.2	0.55	T.
Santa Gertrude	.....	.....	.....	0.27	
Sherman	68	12	37.3	3.41	
Sonora	78	13	45.0	0.02	T.
Sugarland	75	23	48.8	2.14	
Sulphur Springs	68	13	39.0	3.39	
Temple *a*	72	13	41.9	1.15	
Temple *b*	75	14	42.2	0.94	
Texline	64	15	30.6	0.50	5.0
Tilden	90[f]	25[f]	56.9[f]	0.45	
Trinity	74	19	46.8	1.80	
Tulia	65	− 5	33.0	0.68	4.0
Tyler	68	17	40.2	3.35	
Victoria	77	25	53.0	3.84	
Waco	84	17	46.2	1.61	
Waxahachie	75	12	39.4	3.40	T.
Weatherford	69	9	37.3	1.93	
Wichita Falls	.....	.....	.....	1.37	
Utah.					
Alpine	.....	.....	.....	0.79	.....
Aneth	50	10	30.3	1.67	.....
Beaver	60	0	31.8	0.06	0.6
Blackrock	59[d]	− 5	28.2	0.48	4.8
Blacksmith Forks	.....	.....	.....	1.20	12.0
Callao	68	0	28.4	0.05	1.0
Castledale	45	− 5	18.7	0.50	.....
Castle Rock	.....	.....	.....	0.65	3.0
Corinne	60	− 1	29.6	0.35	2.5
Coyoto	63	− 9	28.2	0.47	4.7
Deseret	60	−10	26.8	0.42	8.0
Emery	45	− 2	24.2	0.08	0.8
Escalante	46	3	25.4	1.40	14.0
Experiment Farm	62	13	40.6	.....	.....
Farmington	58	6	31.4	1.47	7.0
Fillmore	71	4	35.2	0.90	.....
Fort Duchesne	40[g]	−22	15.8[d]	0.50	5.0
Frisco	59	12	36.6	0.66	6.8
Garrison	59	0	30.8	0.37	3.7
Giles	51	− 8	27.6	0.47	3.5
Government Creek	54	3	30.1	0.64	6.0
Green River	51	−14	27.6	0.40	4.0
Heber	49	−16	21.2	1.22	10.5
Henefer	55	−13	25.6	1.09	5.0
Hite	56	17	36.4	0.76	.....
Huntsville	.....	.....	.....	1.79	5.0
Ibapah	60	−10	26.9	0.27	2.8
Indianola	.....	.....	.....	0.99	.....
Kanab	51	4	29.7	2.10	.....
Kelton	46	− 3	24.8	0.30	3.2
La Sal	47	7	25.8	0.99	.....
Levan	48	1	26.0	0.91	10.6
Loa	55	− 8	22.7	0.30	3.0
Logan	49	4	27.7	0.40	.....
Manti	54	− 5	24.8	0.85	8.5
Marysvale	61	1	30.6	0.49	4.9
Meadowville	42	0	25.7	2.30	17.0
Millville	.....	.....	.....	1.70	.....
Minersville	59	− 4	32.6	0.60	6.0
Moab	46	− 4	28.8	1.90	19.0
Morgan	52	− 8	26.3	0.84	4.4
Mount Nebo	56	5	30.3	0.61	6.0
Mount Pleasant	59	2	29.2	0.80	8.0
Nephi	.....	.....	.....	0.79	12.5
Ogden	54	10	30.4	1.20	0.5
Parowan	55	0	31.4	0.52	6.3
Payson	.....	.....	.....	1.40	12.5
Pinto	57	− 4	30.8	0.64	7.8
Plateau	54	− 5	29.0	0.63	6.9
Promontory*[1]	45	− 4	27.4	0.24	2.5
Provo	60	− 5	30.4	1.42	10.9

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Utah—Cont'd.					
Ranch	52	− 7	27.8	3.15	......
Randolph	......	......	......	0.70	10.0
Rockville	64	16	42.8	1.45	......
St. George	63	12	42.4	1.60	......
Salt Air	48	9	30.5	0.38	1.0
Scipio	69	− 4	29.8	0.67	3.7
Snowville	57	− 5	27.1	0.83	......
Soldier Summit	38	−10	19.7	0.59	9.0
Thistle	57	−13	26.4	0.97	8.7
Tooele	55	10	32.3	1.02	......
Utah Lake	52	−10	28.6	0.51	1.4
Wellington	46	−11	23.9	0.60	6.0
Woodruff	53[1]	−10[1]	26.7[1]	0.40	4.0
Vermont.					
Burlington	48	− 8	17.0	1.28	9.0
Cavendish	47	−15	15.6	2.66	14.5
Chelsea	42	−16	12.3	1.50	17.0
Chittenden	......	......	......	2.54	25.4
Cornwall	44	−12	16.0	0.96	8.0
Enosburg Falls	50	−28	11.2	1.82	16.5
Jacksonville	32	−19	10.8	6.90	61.0
Manchester	50	−13	16.4	3.14	20.2
Morrisville	47	−26	13.3	3.24	25.9
Norwich	47	−24	12.4	2.24	14.0
St. Johnsbury	49	−28	13.1	1.30	16.0
Wells	48	−12	14.2	1.74	13.0
Woodstock	54	−22	13.3	2.00	19.0
Virginia.					
Ashland	64	− 2	31.5	1.54	7.0
Barboursville	67	2	33.0	3.47	11.0
Bedford	68	5	35.2	2.07	4.5
Bigstone Gap	57	− 2	29.7	3.57	18.2
Blacksburg	59	2	28.9	2.89	7.5
Buchanan	......	......	......	3.47	6.0
Burkes Garden	52	−10	25.0	2.60	15.0
Callaville	66	8	36.1	2.56	1.5
Charlottesville	69	6	33.4	1.99	6.0
Clarksville	......	......	......	2.68	3.0
Columbia	69	0	32.4	2.91	6.0
Dale Enterprise	67	3	28.5	3.54	17.0
Danville	......	......	......	3.18	3.0
Dinwiddie	68	− 1	34.1	2.57	5.0
Elk Knob	54	− 6	28.6	3.64	22.0
Farmville	60	8	35.2	2.66	4.5
Fredericksburg	67	− 3	31.2	2.96	14.3
Grahams Forge	56	1	29.6	2.66	7.2
Hampton	63	8	36.4	3.37	4.9
Hot Springs	55	− 2	25.0	3.37	10.5
Howardsville	......	......	......	2.43	3.0
Ivanhoe	......	......	......	2.57	2.8
Lexington	66	6	31.1	2.84	8.4
Lincoln	64	−13	25.3	3.17	5.0
McDowell	58	−15	25.4	0.72	7.0
Mendota	......	......	......	3.71	13.3
Newport News	62	12	36.2	3.20	2.5
Petersburg	68	11	35.8	2.88	5.2
Radford	......	......	......	1.34	10.0
Randolph	......	......	......	3.78	5.0
Riverton	......	......	......	2.73	
Roanoke	67	5	34.4	3.58	7.5
Rockymount	......	......	......	3.17	4.0
Saxe	70	0	34.2	2.50	2.8
Shenandoah	......	......	......	1.81	12.5
Speers Ferry	......	......	......	3.95	18.0
Spottsville	68	5	35.4	4.04	2.8
Staunton	64	7	31.4	3.03	12.0
Stephens City	63	− 5	49.0	2.70	......
Warsaw	62	5	32.1	1.58	8.0
Wilkerson	65	− 3	31.4	3.15	8.2
Williamsburg	65	3	34.0	3.72	5.0
Woodstock	68	− 2	29.2	3.24	13.9
Wytheville	57	0	28.8	2.44	12.9
Washington.					
Aberdeen	55	21	40.2	12.21	8.0
Anacortes	55[1]	24[1]	40.6[1]	2.72	
Ashford	......	......	......	3.29	2.0
Bellingham	59	20	40.2	2.80	
Blaine	54	20	38.0	5.46	
Brinnon	55	23	38.4	12.86	9.0
Cedonia	41	3	26.4	2.12	11.2
Centralia	53	16	38.2	3.30	8.0
Cheney	52	10	32.2	3.23	11.0
Clearbrook	49	10	35.6	4.74	
Clearwater	52	24	39.2	13.02	1.5
Cle Elum	47	− 6	27.6	2.82	21.0
Colfax	52	9	34.4	1.86	1.0
Colville	46	− 8	26.6	2.79	10.8
Conconully	43	− 9	24.4	1.70	11.9
Coupeville	57	24	40.2	1.56	1.8
Crescent	48	0	27.8	2.01	8.5
Cusick	40[c]	−14[e]	22.0[e]	1.44	6.9
Danville	45	− 8	24.2	1.84	9.3
Dayton	62	16	34.0	1.10	4.5
East Sound	56	22	39.8	2.96	1.0
Ellensburg	47	− 7	27.6	1.81	17.0
Ephrata	50	7	30.5	2.35	13.0
Grandmound	53[f]	15[g]	37.0[g]	4.84	8.0
Granite Falls	......	......	......	5.38	
Washington—Cont'd.					
Horseheaven	......	......	......	1.95	14.2
Ilwaco	55	25	42.7	9.95	1.0
Lacenter	52	19	37.8	3.85	2.5
Lakeside	47	4	29.8	1.79	16.4
Lester	49	12	34.4	3.96	19.0
Lind	49	10	32.0	1.94	7.3
Loomis	38	4	25.2	......	......
Mottinger Ranch	55	13	34.7	1.27	4.0
Mount Pleasant	55	22	38.0	3.12	T.
Moxee	52	6	32.0	1.19	4.8
Northport	43	− 6	26.2	......	10.9
Odessa	50	11	32.0	1.20	
Olga	55	26	40.6	2.95	1.0
Olympia	53	16	38.2	6.14	8.0
Pinehill	52	19	34.1	3.88	23.5
Pomeroy	56	13	33.9	1.26	0.7
Port Townsend	53	27	41.0	1.11	1.0
Pullman	49[e]	10[f]	32.4[f]	1.68	8.0
Rattlesnake	46	7	27.1	3.97	10.2
Republic	42	−14	23.4	1.99	9.0
Ritzville	......	......	......	0.64	1.5
Rosalia	52	14	31.8	1.88	4.4
Sedro	56	19	38.6	3.39	
Snohomish	52	17	38.1	4.54	T.
Snoqualmie	51	22	37.8	4.15	
Southbend	62	25	42.2	......	4.0
South Ellensburg	46	− 6	27.6	1.75	20.0
Sprague	......	......	......	3.50	7.0
Sunnyside	59	7	31.3	0.87	2.7
Trinidad	46	7	29.4	1.45	9.5
Twisp	42	−16	21.2	2.28	24.0
Union	57	19	37.8	14.26	12.5
Vancouver	58	21	39.0	4.46	4.0
Vashon	53	26	40.0	6.33	6.5
Wahluke	54	12	33.4	0.84	2.7
Waterville	41	− 1	24.2	3.29	29.7
Wenatchee (near)	44	2	27.5	2.47	24.0
Wilbur	40	− 2	26.9	2.68	4.9
Zindel	64	18	37.8	0.48	0.8
West Virginia.					
Bancroft	65	− 1	27.8	2.30	23.0
Bayard	54	− 9	22.4	3.38	33.8
Bens Run	60	− 3	25.6	2.49	21.0
Bluefield	58	− 4	27.8	3.43	34.0
Buckhannon	60	−14	24.2	3.55	33.2
Burlington	63	2	27.0	2.45	21.0
Cairo	63	−14	25.8	3.26	21.0
Central	61	−12	24.4	3.19	20.0
Charleston	64	2	31.2	3.43	9.0
Creston	62	− 8	24.9	1.83	11.3
Cuba	62	−10	24.4	2.46	22.2
Doane	70	− 3	29.6	3.70	22.0
Elkhorn	61	− 2	29.4	3.36	28.0
Fairmont	......	......	......	3.53	22.5
Glenville	64	− 6	27.0	4.05	26.0
Grafton	59	− 6	25.7	3.28	26.2
Green Sulphur Springs	60	− 5	25.7	1.56	11.0
Harpers Ferry	......	......	......	4.89	18.2
Hinton	......	......	......	2.49	11.3
Huntington	61	0	26.1	2.30	14.0
Leonard	53	− 6	24.5	3.61	26.0
Lewisburg	58	− 4	27.8	3.21	14.0
Logan	60	2	31.4	5.00	22.0
Lost Creek	59	−12	22.7	3.35	20.0
Mannington	59	−10	25.9	3.61	23.9
Martinsburg	64	− 1	28.0	3.70	13.0
Moorefield	68	− 9	30.0	2.05	23.0
Morgantown	58	− 5	25.6	3.48	25.5
Moundsville	58	− 7	26.2	1.78	14.0
New Cumberland	58	− 8	23.6	1.48	14.0
New Martinsville	60	− 6	27.4	2.42	12.1
Nuttallburg	62	2	26.2	3.55	34.0
Philippi	60	− 8	26.2	3.02	22.6
Pickens	57	− 6	23.2	4.98	50.0
Point Pleasant	54	− 1	27.8	2.22	11.0
Princeton	56	− 4	28.7	4.80	34.0
Romney	64	2	26.5	2.03	11.8
Rowlesburg	......	......	......	3.98	32.2
Ryan	62	− 9	25.6	2.72	20.0
Smithfield	60	− 9	24.2	3.36	24.4
Southside	62	− 6	25.8	2.05	16.2
Terra Alta	52	− 7	24.6	7.43	49.7
Uppertract	64	− 4	27.8	2.94	23.5
Valley Fork	65	− 1	32.4	3.60	18.0
Wellsburg	54[c]	− 3[c]	23.4	3.34	22.5
Weston	60	−14	24.3	4.34	26.5
Wheeling *b*	58	− 1	28.8	1.71	10.5
Williamson	65	− 1	28.2	2.00	5.0
Wisconsin.					
Amherst	41	−19	7.8	1.30	13.0
Antigo	40	−18	8.4	1.20	12.0
Appleton	38	−16	11.0	1.31	23.3
Appleton Marsh	40	−28	6.2	0.94	9.6
Ashland	......	......	......	1.34	13.4
Barron	36	−30	4.6	1.50	15.0
Beloit	40	−11	14.4	0.94	4.7
Berlin	34	−22	7.2	......	......
Brodhead	40	−16	12.8	0.80	8.0
Wisconsin—Cont'd.					
Burnett	34	−20	8.8	0.82	15.5
Butternut	36	−30	5.8	1.63	16.3
Chilton	36	−17	10.6	2.31	23.1
Citypoint	40	......	......	0.72	10.0
Darlington	36	−26	7.9	0.85	8.5
Downing	40	−28	4.4	1.60	16.0
Eau Claire	41	−25	5.8	0.73	7.3
Florence	40	−15	9.1	1.05	10.5
Fond du Lac	36	−26	9.2	1.42	15.0
Grand Rapids	41	−26	6.4	0.44	10.5
Grantsburg	35	−32	3.7	1.45	14.5
Hancock	40	−23	7.6	1.10	11.0
Harvey	40	−14	12.0	1.08	12.2
Hayward	35	−36	2.0	0.57	5.7
Hillsboro	39	−35	5.4	1.15	11.5
Koepenick	48	−26	7.7	1.80	18.0
Ladysmith	37	−34	4.7	......	......
Lancaster	38[c]	−17[d]	9.6[d]	0.63	9.0
Manitowoc	42	−13	14.4	1.34	22.0
Meadow Valley	39	−28	4.6	0.78	14.0
Medford	42	−27	6.6	0.50	5.0
Menasha	......	......	......	1.43	20.5
Minocqua	47	−23	6.8	0.63	10.0
Mount Horeb	42	−18	9.4	0.86	9.5
Neillsville	40	−27	4.0	0.60	6.0
New London	38	−19	9.2	1.11	24.0
New Richmond	49	−25	6.2	0.80	8.0
Oconto	40	−14	11.0	2.05	20.5
Osceola	37	−32	2.7	0.35	4.5
Oshkosh	40[b]	−21[e]	9.5[e]	1.30	13.0
Pine River	42	−20	9.7	0.83	13.0
Portage	38	−20	10.0	0.80	11.0
Port Washington	37	−17	10.2	1.60	16.0
Prairie du Chien *a*	47	−20	11.0	0.99	9.9
Prentice	52	−31	6.0	1.00	11.5
Racine	44	−11	16.6	0.93	9.3
Sheboygan	44	−11	15.6	3.75	37.5
Spooner	37	−35	3.8	0.44	9.2
Stanley	44	−28	6.4	0.92	13.0
Stevens Point	45	−27	8.0	1.00	10.0
Valley Junction	44	−25	8.2	0.75	8.0
Viroqua	36	−20	8.0	1.12	12.5
Watertown	42	−16	10.2	2.47	24.7
Waukesha	38	−16	11.8	0.86	14.1
Waupaca	39	−20	8.2	0.97	16.9
Whitehall	39	−34	5.8	0.80	8.0
Wyoming.					
Afton	44	−17	19.6	1.28	14.0
Alcova	49	−16	24.0	0.83	5.0
Basin	52	− 8	24.0	0.08	......
Bedford	46	−17	20.1	1.59	15.9
Border	41	−14	17.8	0.90	......
Buffalo	51	−18	20.2	0.25	2.0
Cambria	52	− 7	22.2	0.98	9.7
Chugwater	52	−26	24.2	1.62	16.0
Daniel	44	−26	15.2	0.85	8.5
Embar	59	−19	22.8	0.20	2.0
Evanston	51	− 9	24.6	0.27	3.0
Fontenelle	40	−18	16.4	0.50	5.0
Fort Laramie	53	−30	21.6	1.22	14.1
Fort Washakie	55	−16	21.6	0.55	5.5
Gillette	47	−12	20.8	0.82	8.0
Granite Canyon	50[e]	−23	23.6[e]	1.15	11.5
Green River	53	−12	24.2	1.15	......
Griggs	55	−20	21.0	0.89	8.6
Hatton	......	......	......	2.80	28.0
Hyattville	60	−14	25.1	0.50	5.0
Iron Mountain	51	−29	22.8	0.95	13.2
Kirtley	49	−22	19.4	0.64	5.5
Laramie	47	−24	22.7	0.39	4.7
Leo	46	−24	22.0	0.72	10.5
Little Medicine	43	−22	17.4	1.44	15.0
Lolabama Ranch	47	−14	20.8	0.36	......
Lusk	51	−33	19.2	1.05	10.5
Meeteetse	52	−13	19.2	0.30	3.0
Moore	49	−20	25.0	0.90	14.9
Moorcroft	52	−18	17.8	0.60	6.0
Phillips	57	−24	25.2	1.20	12.0
Pine Bluff	59	−26	23.1	0.50	5.0
Red Bank	53	−13	23.6	0.77	......
Rock Springs	52	−13	25.0	0.45	4.5
Sheridan	58	−17	22.6	0.75	7.5
South Pass City	45	−20	15.6	1.30	13.0
Story	......	......	......	2.15	21.5
Thermopolis	51	−12	22.2	0.05	0.5
Torrington	54	−28	23.4	0.71	9.5
Wells	36	−19	15.8	1.73	18.5
Wilson	......	......	......	2.70	27.0
Yellowstone Park (C. H.)	40	−23	15.7	0.84	21.5
Yellowstone Pk. (Foun'n)	......	......	......	0.14	......
Yellowstone Pk. (Lake)	40	−21	15.6	0.64	......
Yellowttone Pk. (Norris)	......	−20	......	1.30	16.2
Yellowstone Pk. (U. Ba'n)	44	−20	19.0	......	......
Yellewstone Pk. (Soda B.)	45	−28	15.0	1.00	16.0
Porto Rico.					
Adjuntas	86	50	68.4	6.53	
Aguirre	92	64	76.3	1.53	
Aibonito [g]	78	49	66.5	3.94	

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TABLE II.—*Climatological record of voluntary and other cooperating observers. Late reports for December*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Porto Rico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Aricebo	86	52	69.4	3.72	
Barros	.....	.....	.....	6.42	
Bayamon	87	57	72.4	6.56	
Caguas	88	57	72.4	3.96	
Canovanas	87	65	75.2	8.33	
Cidra	89	54	72.2	17.40	
Coamo	89	56	74.4	0.66	
Corozal	.....	.....	.....	6.00	
Fajardo	88	60	74.7	6.65	
Guanica	91	58	74.9	0.29	
Hacienda Josefa	.....	.....	.....	2.45	
Humacao	88	70	79.0	3.51	
Isabela	87	63	75.0	2.98	
Juana Diaz	93	64	78.4	T.	
La Carmelita	83	60	71.4	6.22	
La Ysolina	86	62	73.4	4.01	
Lares	88	54	71.0	6.34	
Manati	90	59	74.4	6.68	
Maunabo	90	62	76.3	3.98	
Mayaguez	89	59	74.6	2.98	
Morovis	89	56	72.8	6.95	
Ponce	90	61	75.6	0.12	
Rio Blanco	87	60	74.5	6.83	
Rio Piedras	.....	.....	.....	3.64	
San German	88	59	73.8	3.47	
San Lorenzo	89	54	71.6	3.86	
San Salvador	82	58	70.2	8.31	
Santa Isabel	88	61	74.1	1.49	
Vieques	89	66	77.1	3.13	
Yauco	84	61	73.6	1.20	
Mexico.					
Vera Cruz	83	57	68.8	1.32	
New Brunswick.					
St. John	44	−10	14.1	6.68	1.04

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Late reports for December, 1904.					
Alaska.	°	°	°	*Ins.*	*Ins.*
Chestochena	32	−29	−3.6	0.20	2.0
Copper Center	32	−31	−4.7	0.68	9.6
Fairbanks	23	−47	−10.8	.....	.....
Fort Gibbon	.....	.....	.....	0.70	7.0
Fort Liscum	43	4	25.4	3.99	20.8
Juneau	60	17	38.7	8.89	.....
Kenai	39	−20	15.0	0.66	11.5
Ketchemstock	30	−41	−4.0	0.18	3.5
Kodiak	55	10	32.8	3.24	1.1
Orca	47	21	32.0	19.05	14.0
Sunrise	42	− 9	19.0	8.31	31.7
Tanana	.....	−29ᵃ	.....	0.90	9.0
Teikhill	35	−22	2.4	2.95	28.0
Florida.					
Monticello	79	23	53.1	3.46	
Georgia.					
Allapaha	78	24	50.8	3.17	
Covington	71	22	46.0	3.89	T.
Cuthbert	72	22	47.6	4.02	
Iowa.					
Fayette	45	−20	18.5	2.30	19.5
Osceola	65	− 6	24.4	1.50	15.0
New Jersey.					
Sandy Hook	47	10	28.8	3.36	27.7
South Carolina.					
Kingstree *a*	76	22	47.6	4.85	
Porto Rico.					
Cidra	91	51	72.0	13.80	
Coamo	90	60	76.2	1.15	
Mexico.					
Coatzacoalcos	84	.....	.....	13.74	
Vera Cruz	84	58	72.0	.....	

EXPLANATION OF SIGNS.

[a] Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "n" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks of whatever duration, in the precipitation record receive appropriate notice.

TABLE III.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of January, 1905.*

Stations.	Component direction from— N.	S.	E.	W.	Resultant. Direction from—	Duration.
	Hours.	Hours.	Hours.	Hours.	°	Hours.
New England.						
Eastport, Me	26	10	9	33	n. 56 w.	29
Portland, Me	23	20	1	35	n. 85 w.	34
Concord, N. H.†	11	9	6	13	n. 74 w.	7
Northfield, Vt	26	29	4	9	s. 59 w.	6
Boston, Mass	23	12	6	35	n. 69 w.	31
Nantucket, Mass	24	11	10	31	n. 59 w.	25
Block Island, R. I	24	12	9	32	n. 62 w.	26
Narragansett, R. I.*	11	8	5	16	n. 75 w.	11
Providence, R. I	25	10	6	34	n. 62 w.	32
Hartford, Conn	27	22	3	24	n. 77 w.	22
New Haven, Conn	26	13	10	26	n. 51 w.	21
Middle Atlantic States.						
Albany, N. Y	29	18	11	21	n. 42 w.	15
Binghamton, N. Y.†	10	3	7	17	n. 55 w.	12
New York, N. Y	21	5	11	32	n. 53 w.	26
Harrisburg, Pa	15	13	11	32	n. 85 w.	21
Philadelphia, Pa	25	13	12	28	n. 53 w.	20
Scranton, Pa	21	22	12	27	s. 86 w.	15
Atlantic City, N. J	26	11	9	30	n. 55 w.	26
Cape May, N. J	26	11	8	30	n. 56 w.	27
Baltimore, Md	22	12	11	30	n. 62 w.	22
Washington, D. C	23	17	11	19	n. 53 w.	10
Cape Henry, Va.†	10	13	8	9	s. 18 w.	3
Lynchburg, Va	19	20	11	32	s. 87 w.	21
Mount Weather, Va	27	13	9	33	n. 58 w.	28
Norfolk, Va	22	15	18	21	n. 23 w.	8
Richmond, Va	22	20	14	21	n. 74 w.	7
Wytheville, Va	9	13	9	44	s. 83 w.	35
South Atlantic States.						
Asheville, N. C	31	13	10	25	n. 40 w.	23
Charlotte, N. C	19	18	17	25	n. 83 w.	8
Hatteras, N. C	34	6	12	25	n. 25 w.	31
Raleigh, N. C	28	11	11	26	n. 42 w.	23
Wilmington, N. C	29	11	10	23	n. 36 w.	22
Charleston, S. C	22	17	13	23	n. 63 w.	11
Columbia, S. C	22	12	12	29	n. 60 w.	20
Augusta, Ga	21	9	11	36	n. 64 w.	28
Savannah, Ga	24	10	12	27	n. 47 w.	20
Jacksonville, Fla	29	13	12	24	n. 37 w.	20
Florida Peninsula.						
Jupiter, Fla	27	15	14	22	n. 56 w.	22
Key West, Fla	38	4	28	9	n. 29 e.	39
Sand Key, Fla.†	20	4	12	5	n. 24 e.	18
Tampa, Fla	33	7	15	21	n. 13 w.	27
Eastern Gulf States.						
Atlanta, Ga	31	10	11	28	n. 39 w.	27
Macon, Ga.†	15	4	3	17	n. 52 w.	18
Pensacola, Fla.†	21	2	10	5	n. 15 e.	20
Birmingham, Ala.†	13	5	8	8	n.	8
Mobile, Ala	34	16	9	15	n. 18 w.	19
Montgomery, Ala	21	12	17	25	n. 42 w.	12
Meridian, Miss.†	15	8	5	5	n.	7
Vicksburg, Miss	27	13	24	10	n. 45 e.	20
New Orleans, La	31	9	22	12	n. 24 e.	24
Western Gulf States.						
Shreveport, La	23	16	23	17	n. 41 e.	9
Fort Smith, Ark	19	5	28	22	n. 23 e.	15
Little Rock, Ark	28	12	16	20	n. 14 w.	16
Corpus Christi, Tex	25	21	22	7	n. 75 e.	16
Fort Worth, Tex	28	17	14	20	n. 29 w.	12
Galveston, Tex	24	18	20	9	n. 61 e.	12
Palestine, Tex	29	17	16	11	n. 23 e.	13
San Antonio, Tex	33	13	20	10	n. 27 e.	22
Taylor, Tex.†	18	8	5	3	n. 11 e.	10
Ohio Valley and Tennessee.						
Chattanooga, Tenn	21	13	12	31	n. 48 w.	12
Knoxville, Tenn	29	14	12	24	n. 39 w.	19
Memphis, Tenn	27	17	17	19	n. 11 w.	10
Nashville, Tenn	23	19	15	22	n. 60 w.	8
Lexington, Ky.†	7	12	4	15	s. 66 w.	12
Louisville, Ky	17	24	8	27	s. 70 w.	20
Evansville, Ind.†	10	11	5	13	s. 83 w.	8
Indianapolis, Ind	22	18	6	28	n. 80 w.	22
Cincinnati, Ohio	16	22	12	28	s. 69 w.	17
Columbus, Ohio	13	27	10	29	s. 54 w.	24
Pittsburg, Pa	21	15	6	33	n. 78 w.	28
Parkersburg, W. Va	17	13	3	21	n. 77 w.	18
Elkins, W. Va	19	17	3	39	n. 87 w.	36
Lower Lake Region.						
Buffalo, N. Y	12	17	10	34	s. 78 w.	24
Oswego, N. Y	20	21	16	19	s. 72 w.	3
Rochester, N. Y	12	19	12	34	s. 72 w.	23
Syracuse, N. Y	17	23	9	28	s. 72 w.	20
Erie, Pa	14	21	10	29	s. 70 w.	20
Cleveland, Ohio	15	29	7	24	s. 51 w.	22
Sandusky, Ohio†	8	10	4	16	s. 81 w.	12
Toledo, Ohio	14	20	11	34	s. 75 w.	24
Detroit, Mich	15	16	7	35	s. 88 w.	28
Upper Lake Region.						
Alpena, Mich	21	9	6	37	n. 69 w.	33
Escanaba, Mich	23	12	6	37	n. 70 w.	33
Grand Rapids, Mich	20	17	11	23	n. 76 w.	12
Houghton, Mich.†	13	4	8	13	n. 29 w.	10
Marquette, Mich	16	13	5	41	n. 85 w.	36
Port Huron, Mich	14	17	10	34	s. 83 w.	24
Sault Ste. Marie, Mich	20	13	17	24	n. 45 w.	10
Chicago, Ill	26	13	5	33	n. 65 w.	31
Milwaukee, Wis	23	8	2	42	n. 69 w.	42
Green Bay, Wis	21	16	5	36	n. 81 w.	31
Duluth, Minn	15	3	6	46	n. 73 w.	42

Stations.	Component direction from— N.	S.	E.	W.	Resultant. Direction from—	Duration.
	Hours.	Hours.	Hours.	Hours.	°	Hours.
North Dakota.						
Moorhead, Minn	31	15	7	24	n. 47 w.	23
Bismarck, N. Dak	26	8	13	33	n. 48 w.	27
Devils Lake, N. Dak	18	12	7	36	n. 72 w.	20
Williston, N. Dak	26	12	9	28	n. 54 w.	24
Upper Mississippi Valley.						
Minneapolis, Minn.*	11	6	3	17	n. 70 w.	15
St. Paul, Minn	22	15	8	32	n. 74 w.	25
La Crosse, Wis.†	9	11	1	15	s. 82 w.	14
Madison, Wis	24	15	4	36	n. 74 w.	33
Charles City, Iowa	32	11	8	32	n. 49 w.	32
Davenport, Iowa	26	12	5	34	n. 64 w.	32
Des Moines, Iowa	28	14	9	30	n. 56 w.	25
Dubuque, Iowa	27	8	4	36	n. 59 w.	37
Keokuk, Iowa	29	16	7	30	n. 61 w.	26
Cairo, Ill	26	20	7	20	n. 65 w.	14
La Salle, Ill.†	10	6	3	19	n. 76 w.	16
Springfield, Ill	25	14	4	32	n. 68 w.	30
Hannibal, Mo.†	12	9	5	18	n. 77 w.	13
St. Louis, Mo	24	14	12	29	n. 60 w.	20
Missouri Valley.						
Columbia, Mo.*	9	9	4	14	w.	10
Kansas City, Mo	28	15	10	26	n. 51 w.	21
Springfield, Mo	23	18	15	22	n. 54 w.	9
Topeka, Kans.*	12	7	4	13	n. 61 w.	10
Lincoln, Nebr	26	20	10	19	n. 56 w.	11
Omaha, Nebr	29	16	8	21	n. 45 w.	18
Valentine, Nebr	30	8	10	29	n. 41 w.	29
Sioux City, Iowa†	13	8	6	12	n. 50 w.	8
Pierre, S. Dak	20	6	22	24	n. 8 w.	14
Huron, S. Dak	32	16	10	21	n. 34 w.	19
Yankton, S. Dak.†	12	4	5	15	n. 51 w.	13
Northern Slope.						
Havre, Mont	9	12	22	28	s. 63 w.	7
Miles City, Mont	26	20	8	18	n. 59 w.	12
Helena, Mont	16	19	8	34	s. 83 w.	26
Kalispell, Mont	8	11	1	49	s. 86 w.	48
Rapid City, S. Dak	31	8	11	29	n. 38 w.	29
Cheyenne, Wyo	31	15	4	29	n. 57 w.	30
Lander, Wyo	15	23	21	17	s. 27 e.	9
Yellowstone Park, Wyo	12	38	4	22	s. 35 w.	32
North Platte, Nebr	18	12	12	31	n. 72 w.	20
Middle Slope.						
Denver, Colo	21	25	15	10	s. 51 e.	6
Pueblo, Colo	18	15	23	22	n. 18 e.	3
Concordia, Kans	28	17	13	22	n. 39 w.	14
Dodge, Kans	25	13	16	20	n. 18 w.	13
Wichita, Kans	28	18	15	14	n. 6 e.	10
Oklahoma, Okla	34	17	12	13	n. 3 w.	17
Southern Slope.						
Abilene, Tex	27	20	11	17	n. 41 w.	9
Amarillo, Tex	26	17	12	19	n. 38 w.	11
Roswell, N. Mex	23	26	15	11	s. 53 e.	5
Southern Plateau.						
El Paso, Tex	23	9	21	29	n. 30 w.	16
Santa Fe, N. Mex	32	11	33	5	n. 53 e.	35
Flagstaff, Ariz	27	12	15	17	n. 8 w.	15
Phoenix, Ariz	15	8	32	18	n. 63 e.	16
Yuma, Ariz	40	8	17	9	n. 14 e.	33
Independence, Cal	16	25	15	26	s. 51 w.	14
Middle Plateau.						
Carson City, Nev	15	19	16	26	s. 68 w.	11
Winnemucca, Nev	32	11	27	9	n. 41 e.	28
Modena, Utah	9	3	10	45	n. 80 w.	36
Salt Lake City, Utah	9	29	22	18	s. 11 e.	20
Durango, Colo	22	24	5	22	s. 83 w.	17
Grand Junction, Colo	27	12	20	16	n. 15 e.	16
Northern Plateau.						
Baker City, Oreg	7	35	26	15	s. 22 e.	30
Boise, Idaho	14	20	11	28	s. 71 w.	18
Lewiston, Idaho†	3	7	19	7	s. 72 e.	13
Pocatello, Idaho	7	18	20	27	s. 32 w.	13
Spokane, Wash	24	13	30	11	n. 69 e.	31
Walla Walla, Wash	8	38	11	17	s. 11 w.	31
North Pacific Coast Region.						
North Head, Wash	12	15	42	3	s. 86 e.	39
Port Crescent, Wash.*	9	9	19	4	e.	15
Seattle, Wash	27	12	28	6	n. 56 e.	27
Tacoma, Wash	25	21	11	16	n. 51 w.	6
Tatoosh Island, Wash	1	16	42	5	s. 68 e.	40
Portland, Oreg	19	12	25	24	n. 8 e.	7
Roseburg, Oreg	26	14	16	19	n. 14 w.	12
Middle Pacific Coast Region.						
Eureka, Cal	18	29	19	6	s. 50 e.	17
Mount Tamalpais, Cal	18	25	23	14	n. 52 e.	11
Red Bluff, Cal	29	21	13	14	n. 7 w.	8
Sacramento, Cal	18	24	29	7	s. 75 e.	23
San Francisco, Cal	26	17	15	18	n. 18 w.	10
Point Reyes Light, Cal.*	8	15	12	7	s. 36 e.	9
Southeast Farallon, Cal.*	22	22	19	14	e.	5
South Pacific Coast Region.						
Fresno, Cal	16	27	23	12	s. 45 e.	16
Los Angeles, Cal	25	9	26	17	n. 29 e.	18
San Diego, Cal	30	8	13	25	n. 29 w.	25
San Luis Obispo, Cal	29	18	9	14	n. 24 w.	12
West Indies						
Grand Turk, W. I.†	10	6	21	2	n. 78 e.	19
Hamilton, Bermuda	26	16	10	26	n. 58 w.	19
Havana, Cuba†	10	4	17	5	n. 63 e.	13
San Juan, Porto Rico	6	31	36	6	s. 50 e.	39

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during January, 1905, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y	2-3			1.08														*			
Alpena, Mich	11-12			0.97														*			
Amarillo, Tex	9-11			0.94														*			
Asheville, N. C	11-12			1.40														0.32			
Atlanta, Ga	11-12	3:10 p. m.	11:45 p. m.	2.29	3:57 p. m. †	4:37 p. m. †	0.97	0.10	0.17	0.22	0.48	0.65	0.72	0.78	0.84						
Atlantic City, N. J	24-25			2.75														*			
Augusta, Ga	6			0.76														0.30			
Baltimore, Md	6-7			2.36														0.58			
Binghamton, N. Y	6-7			0.76														*			
Birmingham, Ala	11-12	3:10 p. m.	8:50 a. m.	2.98	1:16 a. m.	1:29 a. m.	1.54	0.17	0.28	0.37											
Bismarck, N. Dak	20			0.10														*			
Block Island, R. I	7			0.77														*			
Boise, Idaho	13-14			0.50														*			
Boston, Mass	6-7			1.53														0.33			
Buffalo, N. Y	6-7			1.18														*			
Cairo, Ill	11	2:52 p. m.	11:55 p. m.	1.18	3:47 p. m.	4:22 p. m.	0.10	0.06	0.13	0.26	0.38	0.44	0.49	0.55							
Charleston, S. C	19			0.40														0.14			
Charlotte, N. C	12			0.67														0.35			
Chattanooga, Tenn	11-12			1.08														0.32			
Chicago, Ill	11			0.56														*			
Cincinnati, Ohio	10-11			0.81														0.09			
Cleveland, Ohio	*11			0.32														0.10			
Columbia, Mo	10-11			1.45														*			
Columbia, S. C	6			0.68														0.26			
Columbus, Ohio	11			0.43														*			
Concord, N. H	6-7			1.46														*			
Corpus Christi, Tex	8-9			0.54														0.11			
Davenport, Iowa	10-11			0.41														*			
Denver, Colo	17			0.62														*			
Des Moines, Iowa	10-11			0.63														*			
Detroit, Mich	11			0.96														*			
Dodge, Kans	10-11			0.79														*			
Dubuque, Iowa	11			0.51														*			
Duluth, Minn	4-5			0.47														*			
Eastport, Me	7			0.78														0.25			
Elkins, W. Va	12			0.25														0.08			
Erie, Pa	7-8			1.26														*			
Escanaba, Mich	4-7			0.87														*			
Evansville, Ind	10-11			2.45														*			
Fort Smith, Ark	10-11			2.34														*			
Fort Worth, Tex	10-11			1.21														0.42			
Galveston, Tex	9	12 m.	6:30 p. m.	0.99	2:05 p. m.	2:50 p. m.	0.19	0.12	0.18	0.21	0.31	0.43	0.49	0.52	0.63	0.70	0.73				
Grand Junction, Colo	11			0.52														*			
Grand Rapids, Mich	11			0.51														*			
Green Bay, Wis	11-12			0.51														*			
Hannibal, Mo	10-11			1.20														*			
Harrisburg, Pa	5-6			1.71														0.26			
Hatteras, N. C	29-30	11:15 p. m.	4:00 a. m.	0.94	12:37 a. m.	1:17 a. m.	0.19	0.08	0.20	0.29	0.43	0.47	0.53	0.55	0.62						
Huron, S. Dak	10-11			0.21														*			
Indianapolis, Ind	10-11			0.76														*			
Jacksonville, Fla	19	8:55 a. m.	9:45 a. m.	0.81	9:03 a. m.	9:33 a. m.	0.03	0.06	0.12	0.24	0.50	0.70	0.76								
Jupiter, Fla	15			0.73														0.33			
Kalispell, Mont	21-22			0.33														*			
Kansas City, Mo	10-11			0.72														*			
Key West, Fla	13			0.23														*			
Knoxville, Tenn	11-12			1.11														0.24			
La Crosse, Wis	11			0.45														*			
Lewiston, Idaho	23			0.21														*			
Lexington, Ky	10-11			0.40														*			
Lincoln, Nebr	10-11			0.59														*			
Little Rock, Ark	11			1.40														*			
Los Angeles, Cal	21			1.05														0.31			
Louisville, Ky	10-11			1.13														0.23			
Lynchburg, Va	6			1.55														0.26			
Macon, Ga	11-12			0.65														0.31			
Memphis, Tenn	11-12			1.30														0.48			
Meridian, Miss	11-12	2:35 p. m.	10:30 a. m.	3.05	12:35 a. m.	1:00 a. m.	1.65	0.13	0.41	0.57	0.68	0.81									
Milwaukee, Wis	11			0.59														*			
Minneapolis, Minn	11			0.34														*			
Montgomery, Ala	11-12	3:35 p. m.	12:20 p. m.	3.18	10:39 p. m.	10:54 p. m.	0.42	0.24	0.46	0.51											
					3:38 a. m.	4:18 a. m.	1.24	0.11	0.21	0.29	0.37	0.50	0.63	0.75	0.81						
Nantucket, Mass	6-7			1.00														0.28			
Nashville, Tenn	11-12	7:50 p. m.	8:00 a. m.	1.03	8:47 p. m.	9:07 p. m.	0.10	0.13	0.38	0.47	0.55										
New Haven, Conn	12			0.72														0.23			
New Orleans, La	11	6:40 a. m.	4:55 p. m.	1.64	2:41 p. m.	2:56 p. m.	0.93	0.35	0.54	0.68											
New York, N. Y	6-7			1.28														0.30			
Norfolk, Va	3			0.80														0.32			
Northfield, Vt	6-7			0.67														*			
North Head, Wash	22-23			1.92														0.40			
Oklahoma, Okla	10-11			1.55														*			
Omaha, Nebr	10-11			0.78														0.08			
Palestine, Tex	18			0.61														0.30			
Parkersburg, W. Va	12			0.29														0.20			
Pensacola, Fla	12	8:10 a. m.	12:50 p. m.	1.31	10:04 a. m.	10:58 a. m.	0.05	0.18	0.28	0.35	0.53	0.63	0.67	0.92	1.03						
Philadelphia, Pa	6-7			0.98														0.24			
Pittsburg, Pa	6-7			1.11														*			
Pocatello, Idaho	29			0.14														*			
Portland, Me	6-7			1.68														0.18			
Portland, Oreg	22-23			1.36														0.27			
Pueblo, Colo	10-11			0.12														*			
Raleigh, N. C	3			0.68														*			
Richmond, Va	12			0.83														*			
Rochester, N. Y	6-7			1.07														*			
Sacramento, Cal	18-19			0.55														0.30			
St. Louis, Mo	10-11			1.70														*			
St. Paul, Minn	11			0.35														0.07			
Salt Lake City, Utah	12			0.17														*			
San Antonio, Tex	10			0.26														0.12			
San Diego, Cal	15-16			0.69														0.33			
Sandusky, Ohio	11			0.76														*			
San Francisco, Cal	20-21			0.98														0.29			

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Savannah, Ga	19			0.76														0.24			
Scranton, Pa	24–25			1.10														0.10			
Seattle, Wash	2–3			0.67														0.18			
Shreveport, La	11	3:00 p. m.	7:45 p. m.	0.89	4:10 p. m.	4:44 p. m.	0.01	0.13	0.24	0.36	0.49	0.61	0.66	0.74							
Spokane, Wash	27			0.50														*			
Springfield, Ill	10–11			0.77														*			
Springfield, Mo	10–11			2.64														*			
Syracuse, N. Y	6–7			0.55														*			
Tampa, Fla	6			0.19														0.10			
Taylor, Tex.	18			0.22														0.16			
Toledo, Ohio	11			0.63														*			
Topeka, Kans	10–11			0.69														*			
Vicksburg, Miss	11–12	3:33 p. m.	6:41 a. m.	1.34	9:22 p. m.	9:42 p. m.	0.41	0.23	0.43	0.59	0.65										
Washington, D. C	6–7			1.43														0.28			
Wichita, Kans	10–11			0.42														*			
Williston, N. Dak	20			0.06														*			
Wilmington, N. C	6			1.03														0.24			
Wytheville, Va	6–7			0.93														*			
Yankton, S. Dak	10–11			0.30														*			
Havana, Cuba	13			0.29							0.29										
San Juan, Porto Rico	26–27	8:05 p. m.	5:45 a. m.	2.09	8:47 a. m.	9:42 p. m.	0.01	0.09	0.16	0.25	0.38	0.52	0.62	0.69	0.71	0.73	0.78	0.83			

*Self-register not working †Of the 12th.

TABLE V.—*Data furnished by the Canadian Meteorological Service, January, 1905.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure. Sea level, reduced to mean of 24 hours.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	Ins.	Ins.	°	°	°	°	Ins.	Ins.	Ins.
St. Johns, N. F										
Sydney, C. B. I	29.93	29.97	+.04	17.5	— 3.0	28.0	7.0	7.91	+2.81	44.5
Halifax, N. S	29.90	30.01	+.04	18.5	— 3.3	28.3	8.7	8.30	+2.53	46.7
Grand Manan, N. B	29.94	30.00	+.01	19.7	— 3.7	27.8	11.6	6.60	+1.69	47.6
Yarmouth, N. S	29.94	30.02	+.02	23.1	— 3.2	30.1	16.1	4.65	—0.76	18.1
Charlottetown, P. E. I	29.94	29.98	+.02	11.9	— 5.1	21.2	2.6	3.66	—0.30	35.3
Chatham, N. B	29.99	30.02	+.05	6.6	— 3.2	19.4	— 6.2	6.41	+2.82	57.8
Father Point, Que	30.02	30.05	+.07	4.1	— 3.9	12.4	— 4.2	1.82	—1.03	18.2
Quebec, Que	29.75	30.10	+.08	5.8	— 3.3	14.1	— 2.6	2.36	—1.65	23.6
Montreal, Que	29.90	30.13	+.09	8.9	— 2.8	16.4	1.4	4.53	+0.80	45.3
Rockliffe, Ont.	29.48	30.05	+.03	—0.3	— 6.7	12.7	—13.4	2.36	+0.04	23.6
Ottawa, Ont	29.74	30.08	+.05	7.4	— 2.2	15.7	— 0.9	3.29	+0.30	32.9
Kingston, Ont	29.79	30.13	+.08	12.1	— 5.0	20.2	3.9	2.36	—1.09	20.6
Toronto, Ont	29.73	30.13	+.08	17.9	— 3.5	25.3	10.4	3.28	+0.36	26.5
White River, Ont	28.77	30.19	+.18	—5.4	— 5.0	10.7	—21.5	1.41	—0.28	14.1
Port Stanley, Ont	29.48	30.15	+.08	19.4	— 2.8	27.7	11.1	2.83	—0.16	24.5
Saugeen, Ont	29.37	30.11	+.08	18.6	— 1.8	26.0	11.1	3.96	—0.09	39.6

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure. Sea level, reduced to mean of 24 hours.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	Ins.	Ins.	°	°	°	°	Ins.	Ins.	Ins.
Parry Sound, Ont	29.34	30.14	+.13	9.5	— 4.3	19.9	— 1.0	5.25	+1.17	52.5
Port Arthur, Ont	29.48	30.24	+.17	4.4	+ 1.3	14.5	— 5.7	0.22	—0.60	2.2
Winnipeg, Man	29.44	30.36	+.25	—5.2	+ 1.6	5.7	—16.0	0.20	—0.68	2.0
Minnedosa, Man	28.39	30.35	+.25	—2.2	+ 5.0	9.0	—13.4	0.61	—0.19	6.1
Qu'Appelle, Assin	27.93	30.35	+.27	—0.3	+ 3.5	8.5	— 9.1	0.52	+0.02	5.2
Medicine Hat, Assin	27.94	29.36	+.29	10.2	+ 4.7	19.6	0.9	0.70	+0.13	7.0
Swift Current, Assin	27.63	30.38	+.29	6.2	+ 3.1	15.2	— 2.8	0.24	—0.40	2.4
Calgary, Alberta	26.58	30.35	+.32	10.0	+ 1.6	18.8	1.1	1.04	+0.51	10.4
Banff, Alberta	25.48	30.36	+.36	11.8		20.7	2.9	0.55	—0.64	5.5
Edmonton, Alberta	27.89	30.34	+.31	6.2	+ 4.4	15.6	— 3.2	0.50	—0.18	5.0
Prince Albert, Sask	28.63	30.32	+.23	—4.3	+ 4.1	6.4	—15.0	0.20	—0.77	2.0
Battleford, Sask	28.54	30.42	+.34	—1.6	+ 4.3	7.7	—11.0	0.62	+0.22	6.2
Kamloops, B. C.										
Victoria, B. C	30.01	30.11	+.14	41.0	+ 2.5	44.6	37.4	3.34	—2.05	4.5
Barkerville, B. C	25.73	30.20	+.31	15.5	— 2.3	22.4	8.6	2.00	—0.60	20.0
Hamilton, Bermuda	30.01	30.18	+.05	61.9	— 0.1	66.7	57.1	3.22	—1.72	

TABLE VI.—*Heights of rivers referred to zeros of gages, January, 1905.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles.	Feet.	Feet.		Feet.		Feet.	Feet.
Milk River.								
Havre, Mont. (31)								
James River.								
Huron S. Dak. (31)								
Big Blue River.								
Blue Rapids, Kans (18)	42	18	5.7	6	5.0	1-3	5.2	0.7
Republican River.								
Clay Center, Kans (20)	45	22	7.6	11	6.2	2	6.6	1.4
Solomon River.								
Beloit Kans (18)	75	16	1.2	3–5	0.0	1, 2, 6–13		1.2
Smoky Hill River.								
Lindsborg, Kans	109	20	2.0	18, 20	1.5	13	1.8	0.5
Abilene, Kans	45	22	3.7	8, 9	1.4	26, 29, 30	2.2	2.3
Kansas River.								
Manhattan, Kans	160	18	3.5	1	2.8	7–31	2.9	0.7
Topeka, Kans. (18)	87	21	7.2	20	6.3	7		0.9
Missouri River.								
Bismarck, N. Dak	1,309	14	3.8	1	1.4	13, 14	2.4	2.4
Sioux City, Iowa	784	19	5.0	8–31	4.0	1	4.9	1.0
Blair, Nebr	705	15	5.0	16, 17	3.8	3	4.4	1.2
St. Joseph, Mo	481	10	2.1	16, 17	— 4.5	1	0.4	6.6
Kansas City, Mo	388	21	8.0	20, 21	2.0	2	5.7	6.0
Glasgow, Mo. (18)	231	18	1.5	3	— 1.0	9		2.5
Boonville, Mo	199	20	6.2	28, 29	1.8	11	4.2	4.4
Hermann, Mo (17)	103	24	2.4	4, 6, 7	0.5	12	1.7	1.9
Minnesota River.								
Mankato, Minn	127	18	1.9	1, 12-31	1.8	2–11	1.9	0.1
St. Croix River.								
Stillwater, Minn. (31)	23	11						

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles.	Feet.	Feet.		Feet.		Feet.	Feet.
Red Cedar River.								
Cedar Rapids, Iowa	77	14	3.4	3, 11, 13, 16, 18–23, 27–31.	3.0	1, 2	3.3	0.4
Iowa River.								
Iowa City, Iowa (31)	57							
Illinois River.								
Peoria, Ill.	135	14	9.3	25, 26	8.7	1	9.1	0.6
Red Bank Creek.								
Brookville, Pa.	35	8	1.2	1	1.0	2–31	1.0	0.2
Clarion River.								
Clarion, Pa.	32	10	8.0	14	2.3	10	4.6	5.7
Conemaugh River.								
Johnstown, Pa. (5)	64	7	3.8	13	1.5	10–12	2.2	2.3
Allegheny River.								
Warren, Pa.	177	14	4.5	3	1.5	26–28	2.4	3.0
Oil City, Pa	123	13	6.3	14	1.8	30, 31	3.1	4.5
Parker, Pa. (16)	73	20	5.0	4	2.4	11, 12	3.2	2.6
Freeport, Pa. (7)	29	20	16.0	12	3.6	29	6.6	12.4
Cheat River.								
Rowlesburg, W. Va. (23)	36	14	7.4	13	2.2	2, 3		5.2
Youghiogheny River.								
Confluence, Pa. (4)	59	10	4.5	13	0.9	8–11	-1.7	3.6
West Newton, Pa.	15	23	7.0	13	1.0	9, 10	2.4	6.0
Monongahela River.								
Weston, W. Va.	161	18	10.6	12	— 0.9	4	0.3	11.5
Fairmont, W. Va.	119	25	23.9	13	14.6	3–5	15.7	9.3
Greensboro, Pa. (1)	81	18	20.2	14	6.4	31	8.4	13.8
Lock No. 4, Pa.	40	28	24.0	13	6.4	30, 31	8.7	17.6

TABLE VI.—*Heights of rivers referred to zeros of gages*.—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Beaver River.								
Ellwood Junction, Pa. (22)	10	14	2.5	14, 22	1.9	3		0.6
Muskingum River.								
Zanesville, Ohio	70	25	11.9	15	8.0	30, 31	8.9	3.9
Little Kanawha River.								
Glenville, W. Va	77	20	9.0	13	0.0	2, 28, 29	1.5	9.0
Creston, W. Va	38	20	12.0	13	3.0	3-7, 30, 31	3.9	9.0
Great Kanawha, River.								
Charleston, W. Va	58	30	11.3	14	1.5	29, 30	5.4	9.8
New River.								
Radford, Va	155	14	4.6	14	−1.3	3	1.3	5.9
Hinton, W. Va	95	14	4.9	14	1.1	28	1.9	3.8
Scioto River.								
Columbus, Ohio (26)	110	17	3.5	1	1.6	2-4		1.9
Licking River.								
Falmouth, Ky. (15)	30	25	6.0	12	1.0	3	2.4	5.0
Miami River.								
Dayton, Ohio (22)	77	18	1.0	3	0.7	1		0.3
Kentucky River.								
Jackson, Ky	287	24	6.8	14	3.8	6	4.7	3.0
Beattyville, Ky	254	30	3.6	14	0.6	29-31	1.4	3.0
High Bridge, Ky	117	17	11.9	15	9.4	8-11	9.9	2.5
Frankfort, Ky	65	31	7.8	16	6.1	7-10, 27-31	6.5	1.7
Wabash River.								
Terre Haute, Ind	171	16	3.4	26	−0.6	10, 11	1.2	4.0
Mount Carmel, Ill. (25)	75	15	5.4	1	2.9	7		2.5
Cumberland River.								
Burnside, Ky. (7)	518	50	14.4	14	1.6	5, 6	3.5	12.8
Celina, Tenn	383	45	14.7	15	2.7	10, 11	5.6	12.0
Carthage, Tenn	308	40	12.3	16	2.5	11	5.6	9.8
Nashville, Tenn	193	40	17.0	1, 17	8.5	30, 31	11.7	8.5
Clarksville, Tenn	126	42	21.2	13	6.8	11	12.4	14.4
Powell River.								
Tazewell, Tenn (9)	44	20	9.0	13	1.0	24	2.3	8.0
Clinch River.								
Speers Ferry, Va	156	20	9.4	13	0.0	28, 29	1.2	9.4
Clinton, Tenn (3)	52	25	18.7	14	4.8	26	7.3	13.9
South Fork Holston River.								
Bluff City, Tenn. (3)	35	15	4.9	13	0.8	29-31	1.6	4.1
Holston River.								
Rotherwood, Tenn	142	14	5.3	13	0.6	26-31	1.3	4.7
Rogersville, Tenn	103	14	5.9	13	1.8	26	2.7	4.1
French Broad River.								
Asheville, N. C	144	6	3.4	13	−1.3	26	0.0	4.7
Leadvale, Tenn	70	15	5.5	13	−1.0	28	0.2	6.5
Little Tennessee River.								
McGhee, Tenn	17	20	16.0	13	2.0	2	3.6	14.0
Hiwassee River.								
Charleston, Tenn	18	22	15.2	13	1.2	3, 4	2.5	14.0
Tennessee River.								
Knoxville, Tenn	635	29	10.8	14	0.5	28	2.9	10.3
Loudon, Tenn	590	25	12.8	13	1.0	22-30	3.1	11.8
Kingston, Tenn. (2)	556	25	11.6	15	1.7	29	4.0	9.9
Chattanooga, Tenn	452	33	17.2	14	2.4	29, 30	6.1	14.8
Bridgeport, Ala	402	24	13.4	15	1.3	30, 31	4.4	12.1
Guntersville, Ala	349	31	19.5	16	3.7	31	8.1	15.8
Florence, Ala	255	16	11.5	16, 17	2.3	30	5.2	9.2
Riverton, Ala	225	26	18.4	17	4.8	29	9.0	13.6
Johnsonville, Tenn	95	21	16.8	18	4.5	30	9.2	12.3
Ohio River.								
Pittsburg, Pa	966	22	14.8	14	1.5	29-31	14.8	13.3
Davis Island Dam, Pa	960	25	14.5	14	3.7	29, 30	6.3	10.8
Beaver Dam, Pa	925	27	19.5	14	4.7	29	8.2	14.8
Wheeling, W. Va	875	36	19.7	14	3.1	30	7.9	16.6
Parkersburg, W. Va	785	36	17.0	15	6.3	31	9.1	10.7
Point Pleasant, W. Va	703	39	19.7	16	3.0	31	8.8	16.7
Huntington, W. Va	660	50	22.4	16	6.1	31	12.4	16.3
Catlettsburg, Ky	651	50	22.5	16	4.4	31	11.9	18.1
Portsmouth, Ohio	612	50	23.0	17	6.4	31	12.7	16.6
Maysville, W. Va	559	50	22.9	17	8.1	31	13.2	14.8
Cincinnati, Ohio	499	50	24.0	18	9.4	31	14.9	14.6
Madison, Ind	413	46	19.5	19	9.4	9	13.4	10.1
Louisville, Ky	367	28	8.6	19	4.2	30, 31	6.2	4.4
Evansville, Ind	184	35	16.7	21	4.5	3	10.4	12.2
Mount Vernon, Ind. (14)	148	35	15.6	21	4.0	3	10.0	11.6
Paducah, Ky	47	40	16.0	18	7.0	31	11.6	9.0
Cairo, Ill	1	45	18.6	22	9.9	31	14.4	8.7
St. Francis River.								
Marked Tree, Ark. (2)	104	17	5.4	23, 24	3.1	1, 2	4.5	2.3
Neosho River.								
Neosho Rapids, Kans	326	22	0.3	24, 25, 27-30	0.2	1-12, 15, 31	0.3	0.1
Iola, Kans (22)	262	10	0.4	5-9	0.3	1-4		0.1
Oswego, Kans	184	20	0.3	18, 19	0.2	1-17, 20-31	0.2	0.1
Fort Gibson, Ind. T	3	22	9.8	31	9.0	1-8	9.3	0.8
Canadian River.								
Calvin, Ind. T. (8)	99	10	1.0	12	0.1	28, 30, 31	0.4	0.9
Black River.								
Blackrock, Ark	67	12	2.0	20-25	1.4	1-11	1.7	0.6
White River.								
Calicorock, Ark	272	15	0.8	20-27	−0.7	1-11	0.0	1.5
Batesville, Ark	217	18	3.5	21-26, 30	2.2	9-11	2.8	1.3
Newport, Ark	185	26	2.2	23, 24	0.2	6-11	2.8	2.0
Clarendon, Ark	75	30	10.5	26	5.7	9-11	8.0	4.8
Arkansas River.								
Wichita, Kans	832	10	1.2	9	−0.1	1	0.3	1.3
Tulsa, Ind. T (16)	551	16	2.2	12	1.8	1, 5	2.0	0.4
Webbers Falls, Ind. T	465	23	4.0	24-27	2.6	1	3.2	1.4
Fort Smith, Ark	403	22	3.5	14	1.8	9-11	2.5	1.7
Dardanelle, Ark	256	21	3.4	22	1.9	4	2.7	1.5
Little Rock, Ark	176	23	6.0	23, 24	3.4	6-12	4.5	2.6
Yazoo River.								
Greenwood, Miss	175	38	25.8	23, 24	18.9	1	23.5	6.9
Yazoo City, Miss	80	25	17.3	30, 31	10.3	1	15.0	7.0
Ouachita River.								
Camden, Ark	304	39	27.9	16	7.0	9	16.7	20.9
Monroe, La	122	40	27.0	31	24.0	1	25.3	3.0
Red River.								
Arthur City, Tex	688	27	5.9	20, 21	4.2	3-10	4.7	1.7
Fulton, Ark	515	28	11.0	15	4.3	4-7	6.4	6.7
Springbank	441	29	11.6	17	3.8	9	7.1	7.8
Shreveport, La	327	29	5.6	19	0.6	10, 11	2.9	5.0
Alexandria, La	118	33	8.6	1	5.5	12	6.9	3.1
Mississippi River.								
St. Cloud, Minn. (31)	2,034	4	.....	.....	.....	.....	.....	.....
St. Paul, Minn. (31)	1,954	14	.....	.....	.....	.....	.....	.....
Red Wing, Minn. (31)	1,914	14	.....	.....	.....	.....	.....	.....
Reeds Landing, Minn (30)	1,884	12	1.1	11	0.3	1		0.8
La Crosse, Wis. (31)	1,819	12	.....	.....	.....	.....	.....	.....
Prairie du Chien, Wis. (31)	1,759	18	.....	.....	.....	.....	.....	.....
Dubuque, Iowa	1,699	18	4.8	1	3.6	2	4.2	1.2
Clinton, Iowa (31)	1,629	16	.....	.....	.....	.....	.....	.....
Leclaire, Iowa (31)	1,609	10	.....	.....	.....	.....	.....	.....
Davenport, Iowa (24)	1,593	15	8.4	1, 7	5.2	3		3.2
Muscatine, Iowa	1,562	16	5.2	3	3.9	17	4.3	1.3
Galland, Iowa (16)	1,472	8	2.6	5	1.2	3	1.7	1.4
Keokuk, Iowa (18)	1,463	15	3.6	13	1.0	12	2.4	2.6
Warsaw, Ill. (16)	1,458	18	7.9	19	4.3	10, 11	5.8	3.6
Hannibal, Mo. (31)	1,402	13	.....	.....	.....	.....	.....	.....
Grafton, Ill	1,306	23	6.7	25	2.2	1	4.9	4.5
St. Louis, Mo. (7)	1,264	30	9.6	24	−0.3	1	3.3	9.9
Chester, Ill. (4)	1,189	30	8.0	24	0.8	2	4.6	7.2
Cape Girardeau, Mo	1,128	28	6.7	24-27	4.0	19	5.6	2.7
New Madrid, Mo	1,003	34	14.5	23	8.1	31	1.1	6.4
Luxora, Ark	905	33	8.3	24	3.4	1	5.4	4.9
Memphis, Tenn	843	33	11.0	24, 25	5.3	1	8.3	5.7
Helena, Ark	767	42	15.6	26	5.6	1	11.8	10.0
Arkansas City, Ark	635	42	18.0	27	5.9	1	13.5	12.1
Greenville, Miss	595	42	14.2	27, 28	4.6	1	10.5	9.6
Vicksburg, Miss	474	45	15.5	29	2.9	1	10.5	12.6
Natchez, Miss	373	46	18.4	30	6.0	1	13.3	12.4
Baton Rouge, La	240	35	12.0	31	2.8	1	7.7	9.2
Donaldsonville, La	188	28	8.2	31	2.1	1	5.2	6.1
New Orleans, La	108	16	5.7	31	2.6	1	4.2	3.1
Atchafalaya River.								
Simmesport, La	127	.....	16.9	31	7.7	1	12.9	9.2
Melville, La	103	31	20.5	31	11.8	1	16.9	8.7
Morgan City, La. (8)	19	8	3.8	24	1.0	26	2.6	2.8
Penobscot River.								
Mattawamkeag, Me. (33)	87	.....	.....	.....	.....	.....	.....	.....
West Enfield, Me. (31)	.....	.....	.....	.....	.....	.....	.....	.....
Kennebec River.								
Winslow, Me	46	.....	4.6	9	3.3	15, 16, 22, 29	3.9	1.3
Merrimac River.								
Franklin Junction, N. H. (2)	110	.....	5.9	17	3.9	1	5.0	2.0
Concord, N. H. (4)	94	.....	.....	.....	.....	.....	.....	.....
Manchester, N. H	68	.....	3.8	8	2.3	5, 6, 24	3.0	1.5
Connecticut River.								
Wells River, Vt. (31)	255	.....	.....	.....	.....	.....	.....	.....
Whiteriver Junction, Vt (31)	209	.....	.....	.....	.....	.....	.....	.....
Bellows Falls, Vt	170	12	3.0	8	0.4	31	1.5	2.6
Holyoke, Mass	84	9	4.9	8	0.4	17	1.8	4.5
Hartford, Conn. (24)	50	13	11.8	9	4.5	20	.....	7.3
Housatonic River.								
Gaylordsville, Conn	44	15	8.2	8	4.2	1	5.2	4.0
Mohawk River.								
Tribeshill, N. Y	42	15	4.6	9, 13	2.4	12	3.4	2.2
Schenectady, N. Y	19	15	6.5	8	1.3	30, 31	3.1	4.2
Hudson River.								
Glens Falls, N. Y	197	.....	7.0	1	4.5	6, 31	5.8	2.5
Troy, N. Y	154	14	9.0	9	3.0	28, 31	5.6	6.0
Albany, N. Y	147	12	7.3	8	1.5	29	3.6	5.8
Stuyvesant, N. Y	128	9	4.5	8	−0.5	18, 19	1.7	5.0
Pompton River.								
Pompton Plains, N. J. (7)	6	8	8.2	8	4.2	24	4.9	4.0
Passaic River.								
Chatham, N. J. (14)	69	7	8.3	9	3.2	1-3	5.5	5.1
Lehigh River.								
Mauchchunk, Pa. (8)	45	15	10.7	7	4.1	16, 17, 23, 24	4.4	6.6
Schuylkill River.								
Reading, Pa	66	12	9.9	7	0.2	25	1.3	9.7
Delaware River.								
Hancock (E. Branch), N. Y	269	12	7.4	8	3.4	24, 25	4.6	4.0
Hancock (W. Branch), N. Y	269	10	6.8	8	3.5	25	4.6	3.3
Port Jervis, N. Y	204	14	7.5	8	0.7	29	2.5	6.8
Phillipsburg, N. J. (13)	142	26	12.5	7	2.9	24	5.2	9.6
Trenton, N. J	92	18	10.8	8	3.0	29, 30	5.8	7.8
North Branch Susquehanna.								
Binghamton, N. Y	183	16	7.5	8	3.0	25	4.1	4.5
Towanda, Pa	139	16	8.0	8	2.0	23	3.3	6.0
Wilkesbarre, Pa	60	17	14.6	7	5.2	28	9.3	9.4
West Branch Susquehanna.								
Clearfield, Pa	165	8	2.8	14	1.7	1, 2, 6-12	1.9	1.1
Lockhaven, Pa. (31)	65	12	.....	.....	.....	.....	.....	.....
Williamsport, Pa	39	20	11.0	7	2.7	30	4.9	8.3
Juniata River.								
Huntingdon, Pa	90	24	4.3	14	3.2	26	3.6	1.1
Susquehanna River.								
Selingsgrove, Pa	116	17	7.6	8	2.0	31	3.5	5.6
Harrisburg, Pa	69	17	9.9	8	2.9	26	5.0	7.0
Shenandoah River.								
Riverton, Va	58	22	0.5	1-6	0.0	7	0.2	0.5
Potomac River.								
Cumberland, Md	290	8	5.0	13	2.8	1-3	3.4	2.2
Harpers Ferry, W. Va	172	18	4.0	16	1.0	2-5	2.0	3.0
James River.								
Buchanan, Va (6)	305	12	5.1	14	2.0	5, 6	2.7	3.1
Lynchburg, Va. (6)	260	18	3.7	15	0.3	2-6	1.2	3.4

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
James River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Columbia, Va.	167	18	7.9	7	2.6	2, 7	4.3	5.3
Richmond, Va.	111	12	2.3	8	− 0.7	28	0.4	3.0
Dan River.								
Danville, Va. (*)	55	8	2.9	8	− 0.3	30, 31	0.4	3.2
Roanoke River.								
Weldon, N. C.	129	30	27.0	9	8.5	27	12.3	18.5
Cape Fear River.								
Fayetteville, N. C	112	38	29.4	8	5.8	30, 31	11.1	23.6
Waccamaw River.								
Conway, S. C.	40	7	3.2	24, 25	1.0	5	2.1	2.2
Pedee River.								
Cheraw, S. C	149	27	20.1	8	2.1	31	5.7	18.0
Smiths Mills, S. C.	51	16	12.2	21	5.0	7	9.1	7.2
Lynch Creek.								
Effingham, S. C.	35	12	7.5	9, 10	5.0	3, 27–31	6.1	2.5
Black River.								
Kingstree, S. C.	45	12	4.6	25, 26	3.5	6	4.0	1.1
Catawba River.								
Mount Holly, N. C	28	15	5.0	13	1.6	20–23, 25–28	1.9	3.4
Wateree River.								
Camden, S. C.	37	24	18.5	15	4.0	29, 30	7.5	14.5
Congaree River.								
Columbia, S. C	52	15	6.7	14	0.4	29	1.3	6.3
Santee River.								
St. Stephens, S. C.	50	12	7.9	21–23	2.2	31	5.3	5.7
Edisto River.								
Edisto, S. C.	75	6	3.2	17–19	2.2	31	2.9	1.0
Broad River.								
Carlton, Ga.	30	11	6.1	13	2.0	5, 6, 29–31	2.6	4.1
Savannah River.								
Calhoun Falls, S. C.	347	15	8.0	13	2.3	31	3.3	5.7
Augusta, Ga.	268	32	• 19.0	14	6.8	29	8.7	12.2
Oconee River.								
Milledgeville, Ga.	147	25	7.0	15	1.8	31	2.8	5.2
Dublin, Ga	79	30	5.0	16	0.4	5, 6	1.7	4.6
Ocmulgee River.								
Macon, Ga.	203	18	9.0	14	1.7	28	3.1	7.3
Abbeville, Ga.	96	11	7.3	19	2.8	31	4.2	4.5
Flint River.								
Woodbury, Ga.	227	10	2.1	13	0.3	28, 29	0.8	1.8
Montezuma, Ga.	152	20	7.6	15	3.2	29–31	4.3	4.4
Albany, Ga.	90	20	6.4	17	2.0	6	3.4	4.4
Bainbridge, Ga	29	22	7.5	19	3.8	7, 8	5.2	3.7
Chattahoochee River.								
West Point, Ga	239	20	12.7	12	2.2	6	3.7	10.5
Eufaula, Ala	90	40	19.5	14	1.8	8	5.1	17.7
Alaga, Ala	30	25	19.0	15	2.9	6	6.1	16.1
Coosa River.								
Rome, Ga.	271	30	20.7	13	1.0	29	4.3	19.7
Gadsden, Ala.	144	22	18.7	15	1.4	5	5.6	17.3
Lock No. 4, Ala.	116	17	14.7	15	1.4	6	5.0	13.3
Wetumpka, Ala	6	45	33.8	15	4.0	6	11.6	29.8
Tallapoosa River.								
Milstead, Ala.	38	35	30.2	14	1.7	5	5.2	28.5
Alabama River.								
Montgomery, Ala.	265	35	32.0	15	1.8	6	9.5	30.2
Selma, Ala	212	35	33.0	17, 18	2.5	8–10	11.2	30.5
Black Warrior River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Tuscaloosa, Ala.	90	43	46.7	14	7.6	7	16.3	39.1
Tombigbee River.								
Columbus, Miss	303	33	12.0	14	0.9	6	4.0	11.1
Vienna, Ala.	233	42	19.9	15	2.8	9	9.4	17.1
Demopolis, Ala.	155	35	36.9	17, 18	5.0	10	18.7	31.9
Leaf River.								
Hattiesburg, Miss	60	20	15.4	13	2.5	4, 5	5.2	12.9
Chickasawhay River.								
Enterprise, Miss	144	18	13.4	13	1.8	11	4.7	11.6
Shubuta, Miss.	106	25	25.0	13, 14	4.6	5, 6	7.7	20.4
Pascagoula River.								
Merrill, Miss.	78	20	19.5	17	2.4	7	9.6	17.1
Pearl River.								
Jackson, Miss	242	20	7.5	20, 30	2.9	8–11	5.2	4.6
Columbia, Miss.	110	14	11.8	14	5.0	3, 4	7.4	6.8
Sabine River.								
Logansport, La.	315	25	24.0	1	5.8	10	10.6	18.2
Neches River.								
Rockland, Tex	105	20	6.0	7	2.8	27, 28	4.2	3.2
Beaumont, Tex.	18	10	1.7	5	− 0.7	26	0.8	2.4
Trinity River.								
Dallas, Tex.	320	25	11.1	12	2.2	3–5	3.0	8.9
Long Lake, Tex.	211	35	11.8	17	1.7	7, 9	4.1	10.1
Riverside, Tex.	112	40	5.1	19	0.6	11	2.1	4.5
Liberty, Tex	20	25	15.2	1	4.2	31	6.2	11.0
Brazos River.								
Kopperl, Tex	345	21	3.8	12	− 1.0	4–10	0.7	4.8
Waco, Tex.	285	24	5.0	13	2.5	1–10	2.8	2.5
Hempstead, Tex	140	40	3.0	1	− 2.2	11–14	−0.8	5.2
Booth, Tex	61	39	6.0	3	2.5	31	4.0	3.5
Colorado River.								
Ballinger, Tex.	489	21	1.5	15–31	1.3	13	1.5	0.2
Austin, Tex.	214	18	1.3	1, 2, 15, 16, 19	1.1	29–31	1.2	0.2
Columbus, Tex.	98	24	7.1	15	5.8	29–31	6.2	1.3
Guadalupe River.								
Gonzales, Tex	112	22	1.0	14	0.6	1, 3–9, 21–31	0.7	0.4
Victoria, Tex	35	16	8.5	1	1.5	29, 30	2.4	7.0
Red River of the North.								
Moorhead, Minn. (31)	284	26	.....	.....	.....	.....	.....	.....
Kootenai River.								
Bonners Ferry, Idaho (31)	123	24	.....	.....	.....	.....	.....	.....
Pend d'Oreille River.								
Newport, Wash	86	14	− 1.2	7	− 3.1	13	−1.5	1.9
Snake River.								
Lewiston, Idaho	144	24	3.6	25	1.2	12–14	2.1	2.4
Columbia River.								
Wenatchee, Wash	473	40	4.5	25, 28–31	3.5	9	4.2	1.0
Umatilla, Oreg (3)	270	25	0.0	2, 29–31	− 2.3	20–22	−1.2	2.3
The Dalles, Oreg.	166	40	2.2	28	− 0.9	14, 15	0.4	3.1
Willamette River.								
Eugene, Oreg.	183	10	7.0	1	3.6	13	5.2	3.4
Albany, Oreg.	118	20	16.8	1	3.8	13	6.7	13.0
Salem, Oreg	84	20	15.7	1	3.2	13, 14	6.4	12.5
Portland, Oreg.	12	15	10.7	1	1.6	14, 15	5.1	9.1
Sacramento River.								
Red Bluff, Cal.	201	23	24.5	23	2.5	12	9.3	22.0
Sacramento, Cal.	64	25	20.8	29–31	16.6	14	18.7	4.2

Small figures indicate number of days river was frozen. (*) Five days missing.

RAINFALL IN JAMAICA.

Through the kindness of Mr. H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table in advance of the regular monthly weather report for Jamaica:

Comparative table of rainfall for January, 1905.

[Based upon the average stations only.]

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1905.	Average.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	23	14.09	7.53
Northern division	22	53	10.11	4.09
West-central division	26	25	5.32	2.80
Southern division	27	31	1.78	1.83
Means	100	132	7.83	4.06

The rainfall for January was, therefore, considerably above the average for the whole island. The greatest rainfall, 37.27 inches, was recorded at Moore Town, in the northeastern division, while, 0.07 inch fell at Plum Point Lighthouse in the southern division.

Honolulu, Hawaii, latitude, 21° 19' north, longitude 157° 52' west; barometer above sea, 38 feet; gravity correction, —.057 applied. January, 1905.

Day.	Pressure.* 8 a. m.	Pressure.* 8 p. m.	Air temperature. 8 a. m.	Air temperature. 8 p. m.	Air temperature. Maximum.	Air temperature. Minimum.	Moisture. 8 a. m. Wet.	Moisture. 8 a. m. Relative humidity.	Moisture. 8 p. m. Wet.	Moisture. 8 p. m. Relative humidity.	Wind. 8 a. m. Direction.	Wind. 8 a. m. Velocity.	Wind. 8 p. m. Direction.	Wind. 8 p. m. Velocity.	Precipitation. 8 a. m.	Precipitation. 8 p. m.	Clouds. 8 a. m. Amount.	Clouds. 8 a. m. Kind.	Clouds. 8 a. m. Direction.	Clouds. 8 p. m. Amount.	Clouds. 8 p. m. Kind.	Clouds. 8 p. m. Direction.
1	30.20	30.18	68.5	68.0	74	65	64.5	80	58.4	56	ne.	6	ne.	13	0.01	T.	10	N.	e.	1	S.-cu.	ne.
2	30.21	30.19	68.5	68.0	72	66	58.4	54	61.7	70	ne.	10	e.	4	0.00	T.	3	S.-cu.	e.	6	N.	?
3	30.14	30.09	69.6	68.0	75	63	61.1	61	62.0	71	e.	10	e.	2	T.	T.	7	S.-cu.	e.	10	N.	e.
4	30.06	30.01	68.9	68.8	74	63	62.4	70	61.3	65	ne.	5	n	2	T.	0.00	2	S.-cu.	e.	4	S.-cu.	n.
5	30.04	29.95	67.4	66.0	71	62	57.8	55	57.5	59	ne.	14	n.	3	0.04	0.00	2	Cu.	n.	2	S.-cu.	n.
6	29.90	29.84	64.5	64.0	73	58	56.5	60	58.5	72	n.	1	n.	6	0.00	0.00	few.	Cu.	calm.	few.	S.-cu.	calm.
7	29.78	29.69	66.2	61.9	72	58	59.8	69	60.4	92	ne.	2	nw.	9	0.00	0.30	9	S.-cu.	sw.	10	N.	calm.
8	29.78	29.78	62.0	63.0	69	58	55.0	64	67.4	71	n.	4	n.	8	0.02	0.00	3	S.-cu.	w.	few.	S.-cu.	calm.
9	29.80	29.84	69.0	69.0	72	58	61.5	65	60.0	59	w.	24	nw.	9	T.	0.04	7	S.-cu.	w.	2	S.-cu.	w.
10	29.90	29.94	67.3	67.0	74	61	61.3	71	62.0	75	nw.	3	n.	5	0.00	0.00	2	S.-cu.	calm.	1	S.-cu.	calm.
11	29.99	29.97	66.5	67.0	74	61	60.5	71	61.0	71	ne.	5	n.	3	0.00	0.00	1	A.-cu.	calm.	few.	S.-cu.	calm.
12	29.96	29.95	68.5	60.5	76	60	61.2	66	54.5	68	ne.	2	n.	7	0.00	0.00	1	S.-cu.	n.	0	0	0
13	29.97	29.96	64.5	65.0	73	61	57.5	66	59.0	70	w.	6	nw.	4	0.00	0.00	few.	S.-cu.	calm.	2	S.-cu.	nw.
14	30.00	29.98	68.0	65.0	72	60	59.7	61	59.0	70	n.	2	ne.	5	0.00	0.00	1 3	Cu. S.-cu.	ne. ne.	few.	S.-cu.	calm
15	29.98	30.01	71.7	67.5	74	62	63.2	63	64.0	83	sw.	17	nw.	20	0.00	T.	9	S.-cu.	s.	10	N.	nw.
16	30.16	30.14	66.4	65.4	71	62	57.9	59	54.4	48	ne.	20	ne.	20	0.01	0.00	4	Cu.	n.	few.	S.-cu.	calm.
17	30.19	30.13	66.2	66.8	72	61	57.4	58	58.3	60	e.	1	e.	4	0.00	0.00	1	S.-cu.	calm.	1	S.-cu.	e.
18	30.19	30.11	67.4	68.5	74	63	58.9	60	62.2	70	ne.	4	e.	5	0.00	0.00	10	S.-cu.	calm.	6	S.-cu.	ne.
19	30.14	30.12	68.5	69.0	74	64	63.0	74	64.0	76	e.	2	ne.	4	T.	0.00	7	A.-s.	calm.	1	S.-cu.	ne.
20	30.08	30.06	69.0	70.2	75	62	62.8	71	62.2	64	ne.	1	ne.	6	0.00	0.00	2	S.-cu.	calm.	6 2	A.-cu. S.-cu.	w. ne.
21	30.05	30.01	68.3	68.2	74	62	62.0	70	62.2	71	e.	1	ne.	5	0.00	0.00	1	S.-cu.	calm.	0	0	0
22	30.07	30.06	68.7	69.0	76	64	63.8	77	62.5	70	ne.	3	ne.	8	0.00	T.	9	S.-cu.	calm.	few.	S.-cu.	calm.
23	30.08	30.00	67.2	69.2	76	63	62.2	75	63.2	72	nw.	3	ne.	4	0.00	0.00	5	Ci.	w.	few.	S.-cu.	calm.
24	30.00	29.99	69.1	68.5	75	63	60.8	62	62.5	72	ne.	2	n.	5	0.00	0.00	1	S.-cu.	ne.	2	S.-cu.	calm.
25	30.00	30.01	69.2	67.0	74	63	63.5	73	65.0	90	n.	2	e.	7	0.00	0.02	few.	S.-cu.	calm.	10	S.-cu.	calm.
26	30.06	30.04	67.4	64.0	74	62	61.9	73	58.0	70	n.	9	nw.	6	0.36	0.00	2 5	A.-cu. S.-cu.	calm. n.	1	S.-cu.	calm.
27	30.04	30.03	63.0	65.5	72	58	57.0	69	56.5	56	n.	4	n.	8	0.00	0.00	few.	S.-cu.	calm.	1	S.-cu.	calm.
28	30.03	30.03	67.4	66.2	70	60	58.0	56	58.2	61	ne.	5	ne.	4	0.00	T.	5	S.-cu.	ne.	8	S.-cu.	ne.
29	30.04	30.06	66.5	65.9	69	62	57.8	59	58.5	64	ne.	7	ne.	8	0.00	0.00	8 1	Ci.-s S.-cu.	w. ne.	10	S.-cu.	ne.
30	30.07	30.09	66.3	66.2	68	64	58.8	64	57.2	57	ne.	16	ne.	12	0.00	T.	10	S.-cu.	ne.	10	S.-cu.	ne.
31	30.08	30.07	65.7	66.0	69	62	58.7	66	56.0	53	ne.	18	n.	5	T.	T.	10	N.	ne.	2	S.-cu.	ne.
Mean	30.032	30.011	67.3	66.6	72.8	61.6	60.2	65.9	59.9	67.9	ne.	6.7	ne.	6.8	0.44	0.36	4.5	S.-cu.	ne.	3.5	S.-cu.	ne.

Observations are made at 8 a. m. and 8 p. m., local standard time, which is that of 157° 30' west, and is 5h and 30m slower than 75th meridian time. * Pressure values are reduced to sea level and standard gravity.

COSTA RICAN CLIMATOLOGICAL DATA.

Communicated by Mr. H. PITTIER, Director, Physico-Geographic Institute.

TABLE 1.—*Hourly observations at the Observatory, San José de Costa Rica, during January, 1905.*

Hours.	Pressure.	Temperature.	Relative humidity.	Rainfall. Amount.	Rainfall. Duration.	Sunshine.	Cloudiness.	Temperature of the soil at depth of— 6 inches.	12 inches.	24 inches.	48 inches.
	Inches.	° *F.*	%	*Ins.*	*Hrs.*	*Hrs.*	%	° *F.*	° *F.*	° *F.*	° *F.*
1 a. m	26.19	61.3	85	0.01	0.17						
2 a. m	26.17	60.9	86	0.01	1.00						
3 a. m	26.16	61.0	85	0.02	0.67						
4 a. m	26.15	60.2	86	0.02	1.00						
5 a. m	26.16	60.3	84	0.01	1.00						
6 a. m	26.17	60.0	83	0.01	1.00						
7 a. m	26.17	59.9	83			6.27	46	69.4	69.8	70.9	70.5
8 a. m	26.19	62.3	77			19.62					
9 a. m	26.20	65.8	69			18.89					
10 a. m	26.20	68.9	64			17.63	57	69.4	69.6	70.9	70.5
11 a. m	26.20	70.6	61			16.44					
Noon	26.19	72.7	58			16.47					
1 p. m	26.17	73.8	57			15.59	65	70.2	70.1	70.9	70.4
2 p. m	26.15	74.2	57			15.49					
3 p. m	26.13	73.8	59			17.24					
4 p. m	26.12	72.0	64			16.80	73	71.5	70.3	70.9	70.5
5 p. m	26.12	69.4	66			11.28					
6 p. m	26.13	66.5	74			3.00					
7 p. m	26.15	64.5	79	0.02	0.17		64	71.0	70.5	70.9	70.5
8 p. m	26.16	62.5	81								
9 p. m	26.18	62.9	82								
10 p. m	26.19	62.6	82				41	70.6	70.5	70.9	70.5
11 p. m	26.19	62.1	83								
Midnight	26.19	61.6	84								
Mean	26.17	65.4	75				58	70.9	70.2	70.9	70.5
Min	26.06	55.2	27								
Max	26.30	84.6	100								
Total				0.10	5.01	174.52					

REMARKS.—At San José the barometer is 3835 feet above sea level. Readings are corrected for gravity, temperature, and instrumental error. The hourly readings for pressure, and wet and dry bulb thermometers, are obtained by means of Richard registering instruments, checked by direct observations every three hours from 7 a. m. to 10 p. m. The thermometers are 5 feet above ground and are corrected for instrumental errors. The total hourly rainfall is as given by Hottinger's self-register, checked once a day. The standard rain gage is 5 feet above ground. Since January 1, 1902, observations at San José have been made on seventy-fifth meridian time, which is 0 hours, 36 minutes, 13.3 seconds *in advance* of San José local time.

TABLE 2.—*Rainfall at stations in Costa Rica, January, 1905.*

Stations.	Rainfall. Amount.	Rainfall. Number of days.	Stations.	Rainfall. Amount.	Rainfall. Number of days.
	Inches.			*Inches.*	
Boca Banano	12.36	21	Peralta	10.28	17
Bearesem	9.80	14	Cachi	2.48	22
Port Limon	12.72	19	Las Concavas	2.87	24
Zent	13.46	22	Tres Rios	0.08	1
Iroquois	16.50	26	San José	0.10	2
Guapiles	16.77	27	La Verbena	0	0
San Carlos	11.93	22	Nuestro Amo	0.04	1
Las Lomas	2.05	21	Puntarenas	0.55	1

Notes on earthquakes.—January 1, 11h 30m a. m., light shock NE.–SE., intensity I, duration 3 seconds. January 3, 4h 32m a. m., very light shock NNW.–SSE., intensity I, duration 1 second. January 20, 0h 23m 8s p. m., very strong NW.–SE., intensity VIII, duration 19 seconds. January 20, 0h 51m 19s p. m., very light shock NW.–SE., intensity I, duration 2 seconds. January 21, 2h 38m a. m., light shock NW.–SE., intensity II, duration 2 seconds. January 21, 10h 57m p. m., very light shock NW.–SE., intensity I, duration 1 second. January 22, 9h 12m a. m., very light shock.

Notes on the weather.—From January 25 to 28 very severe hurricane on the Pacific slope, causing great losses of life and property. On the Atlantic slope, strong northeasterly winds with torrential rains, inundations, and landslides.

Chart I. Tracks of Centers of High Areas, January, 1905.

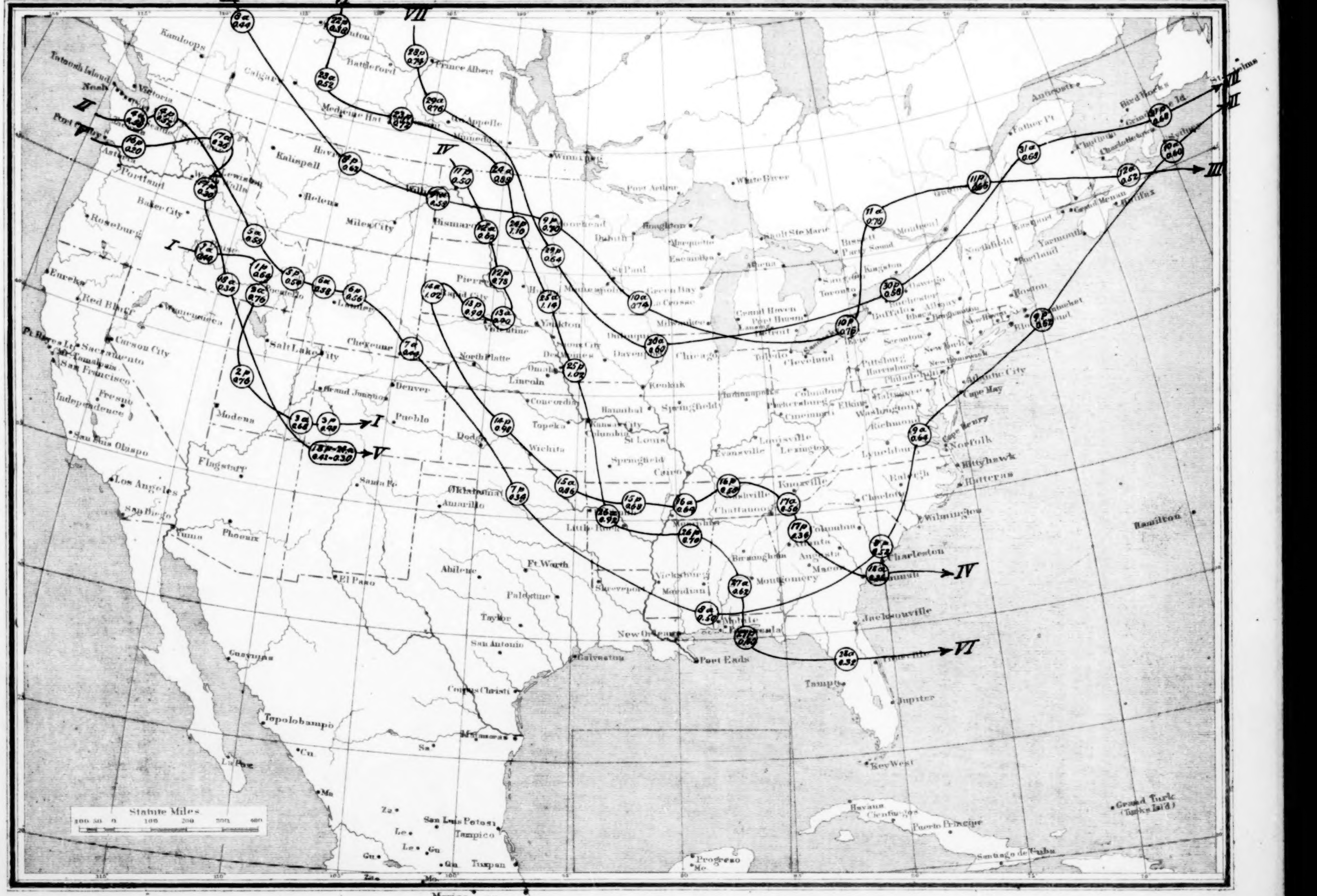
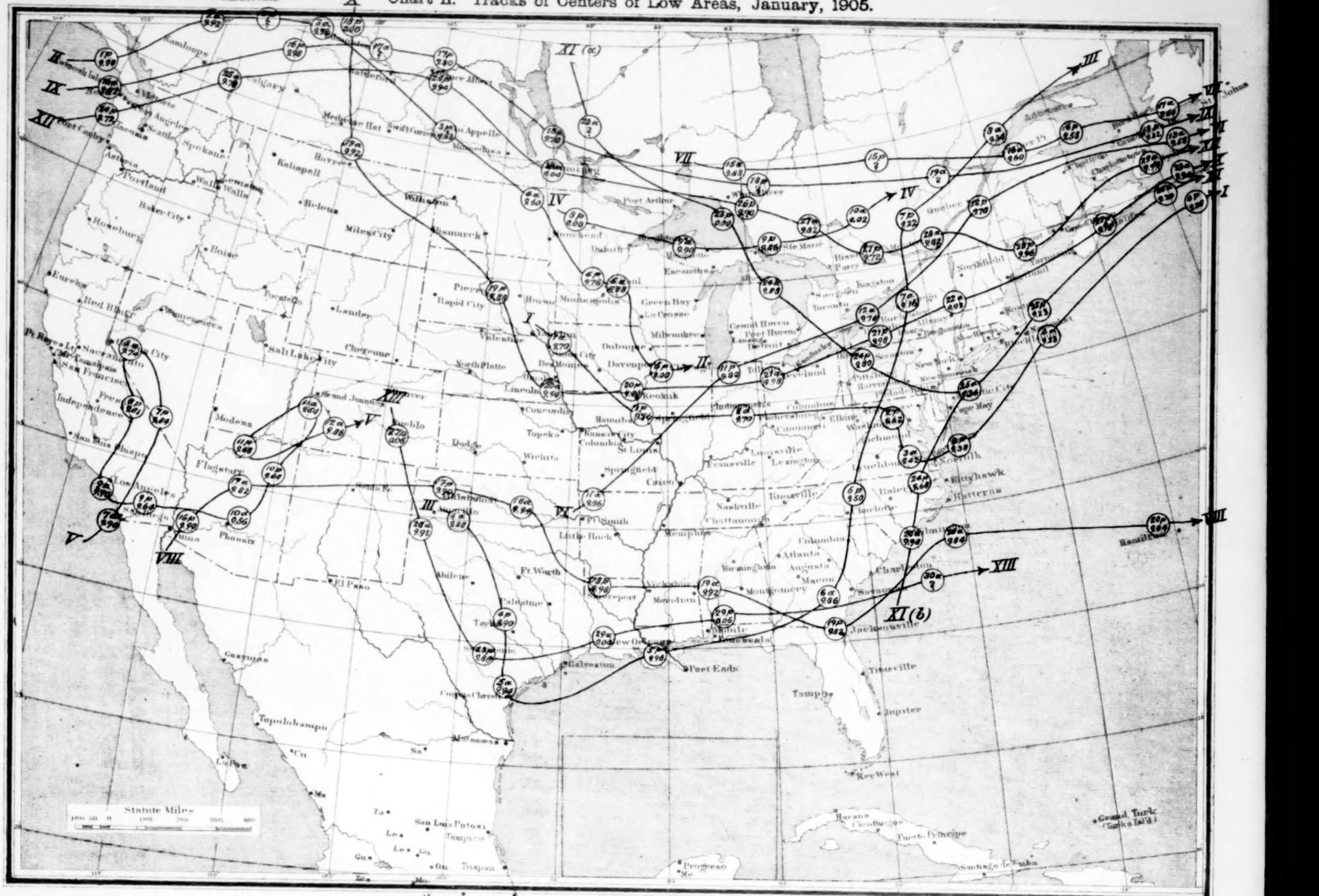


Chart II. Tracks of Centers of Low Areas, January, 1905.



Barkerville

Chart III. Total Precipitation, January, 1905.

Chart III. Total Precipitation, January, 1905.

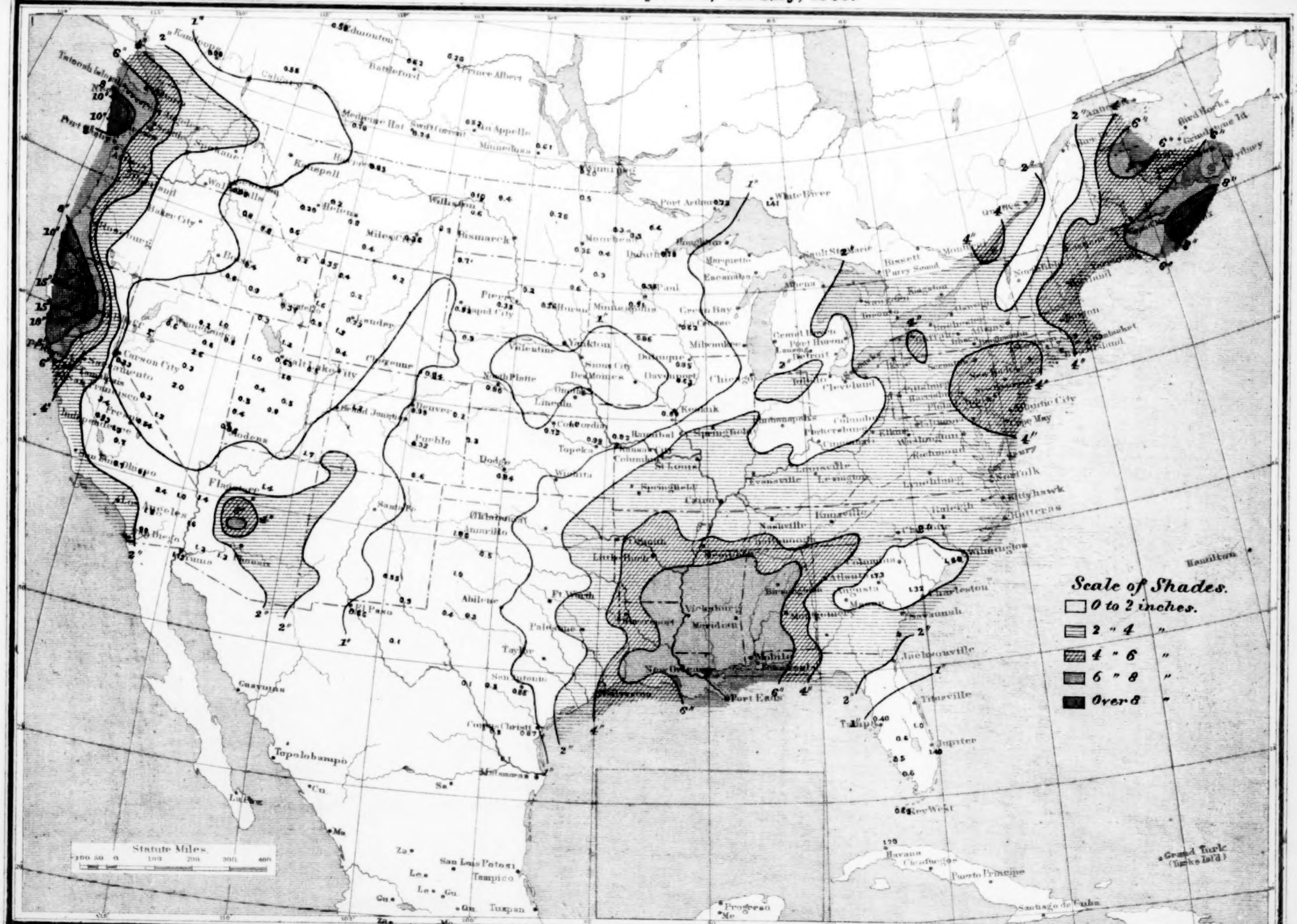
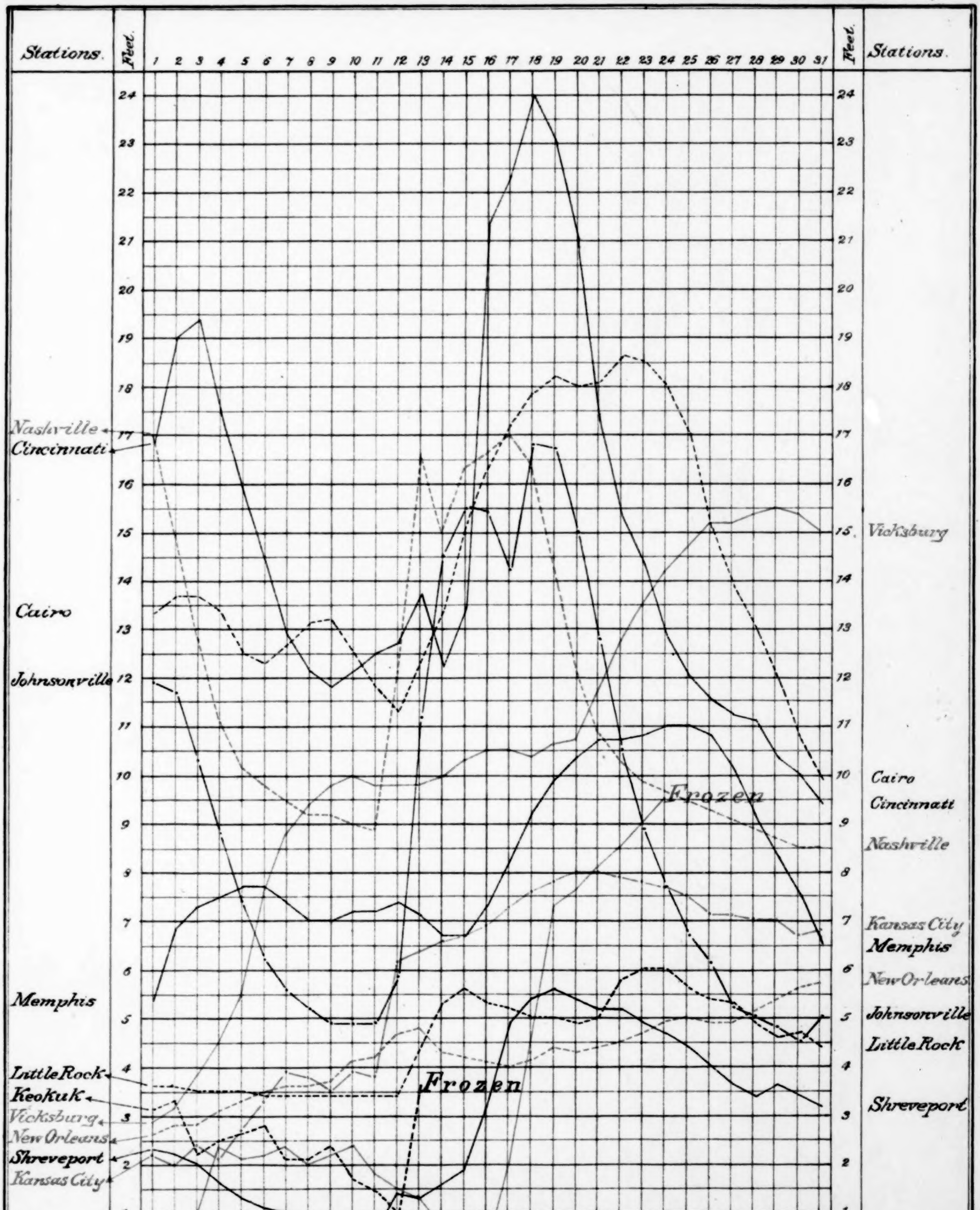


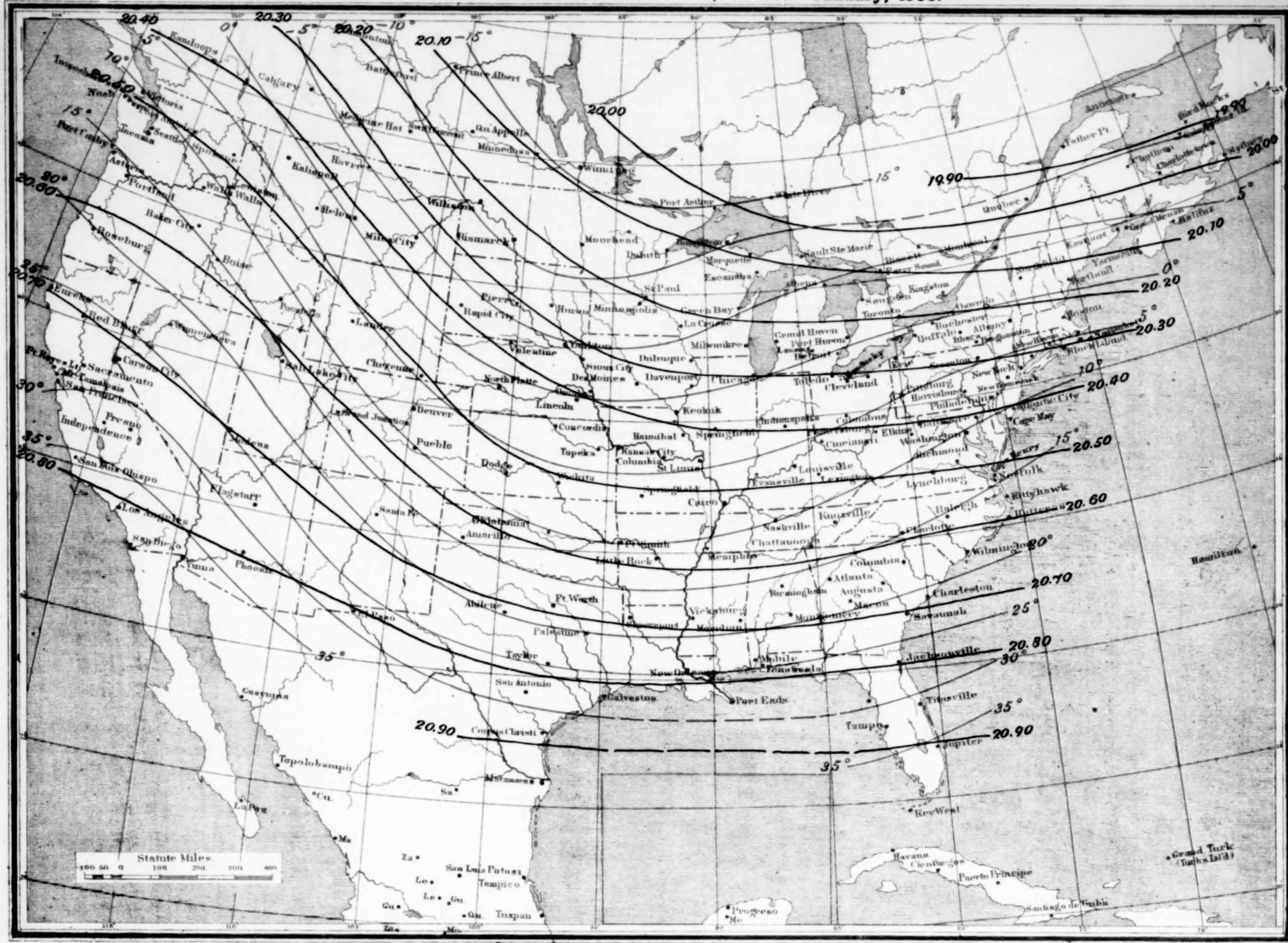
Chart IV. Percentage of Clear Sky, January, 1905.

Chart V. Hydrographs for Seven Principal Rivers of the United States, January, 1905.



• Barkerville

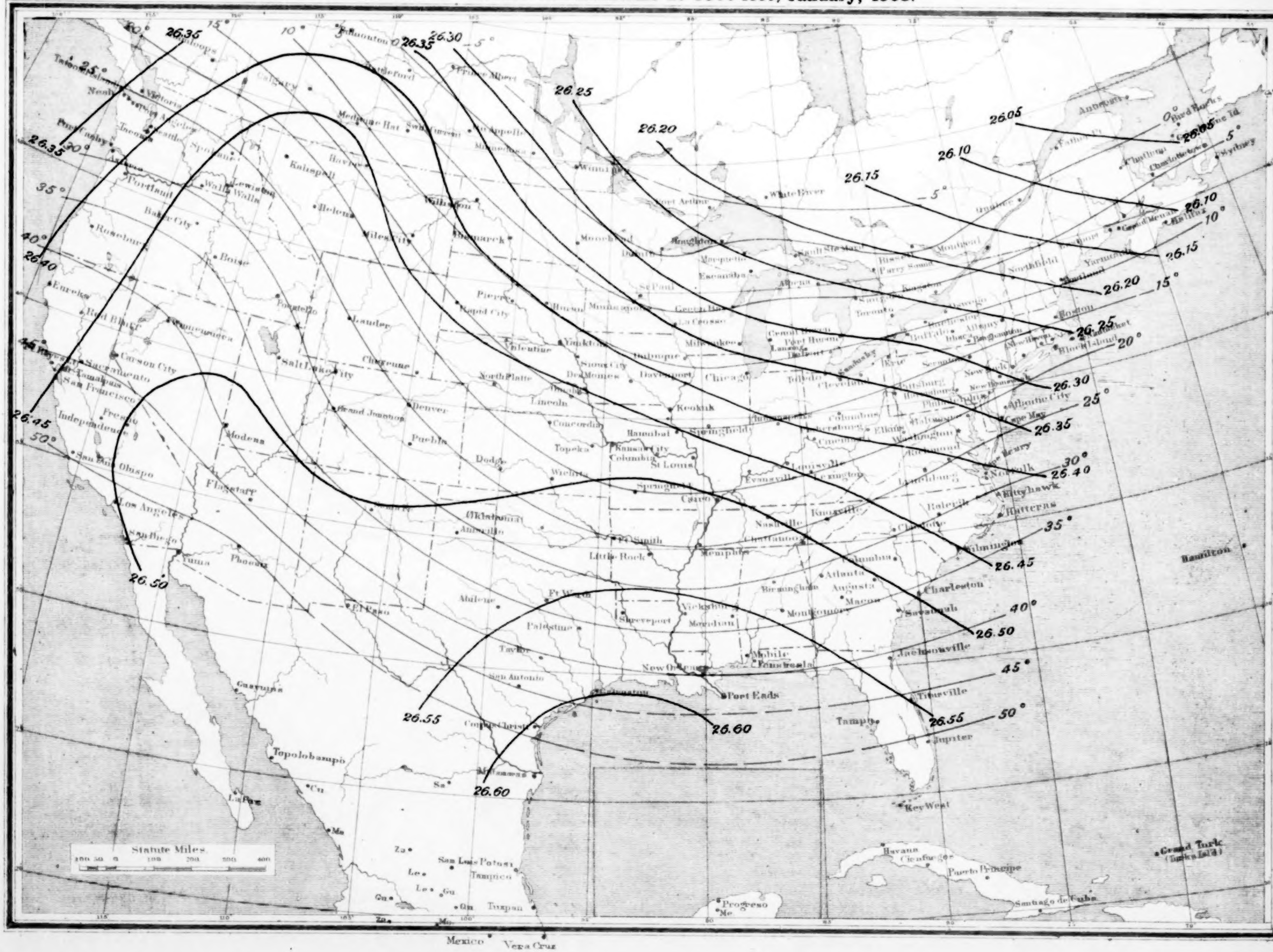
Chart VI. Isobars and Isotherms at 10,000 feet. January, 1905.



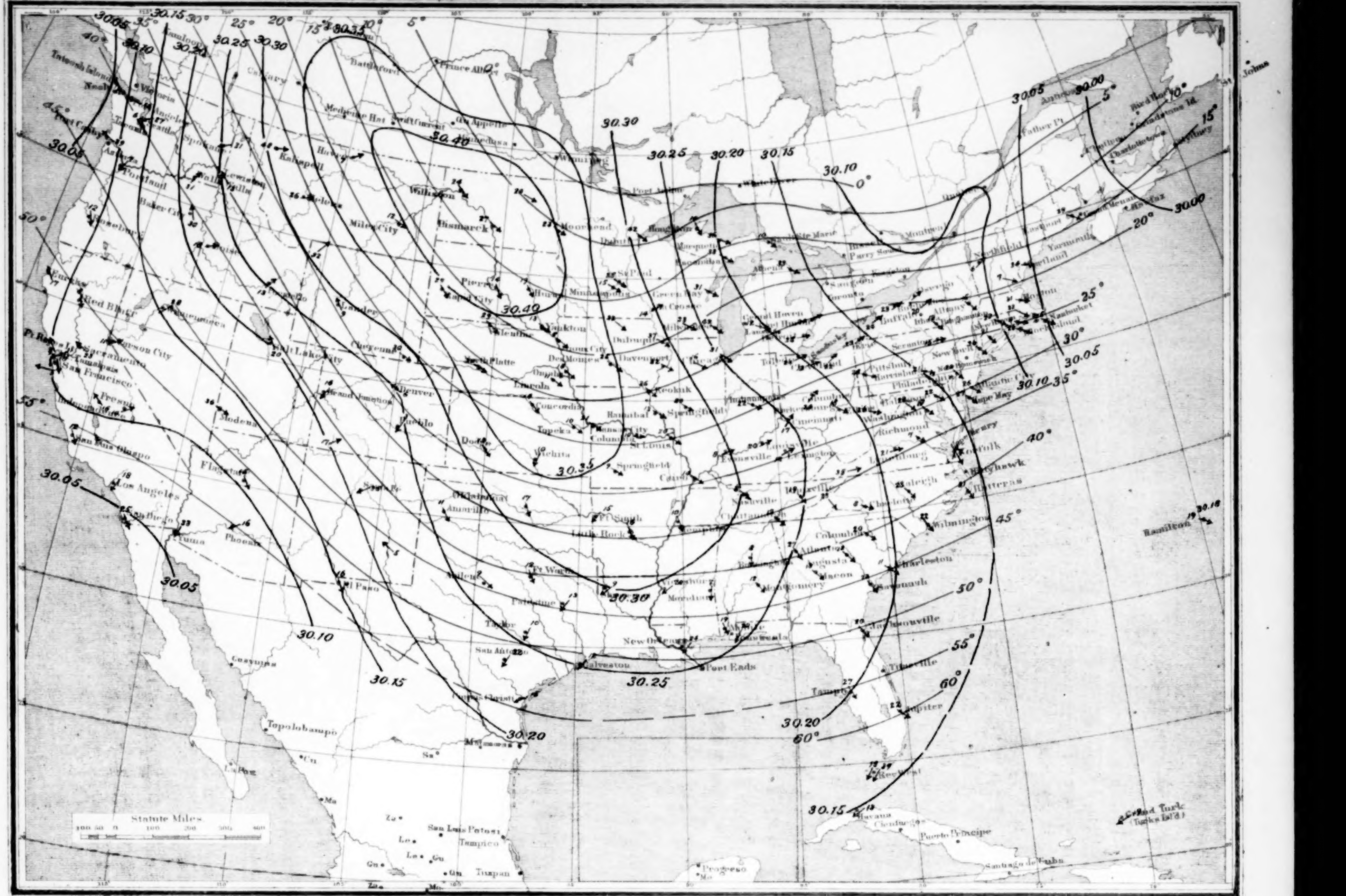
• Barkerville

Chart VII. Isobars and Isotherms at 3500 feet. January, 1905.

Chart VII. Isobars and Isotherms at 3500 feet, January, 1905.



XXXIII—8. Chart VIII. Isobars and Isotherms at Sea Level; Resultant Surface Winds, January, 1905.



XXXIII—9. Chart IX. Sea-Level Isobars, Surface Temperatures, and Resultant Winds, January, 1905.

Chart IX. Sea-Level Isobars, Surface Temperatures, and Resultant Winds, January, 1905.

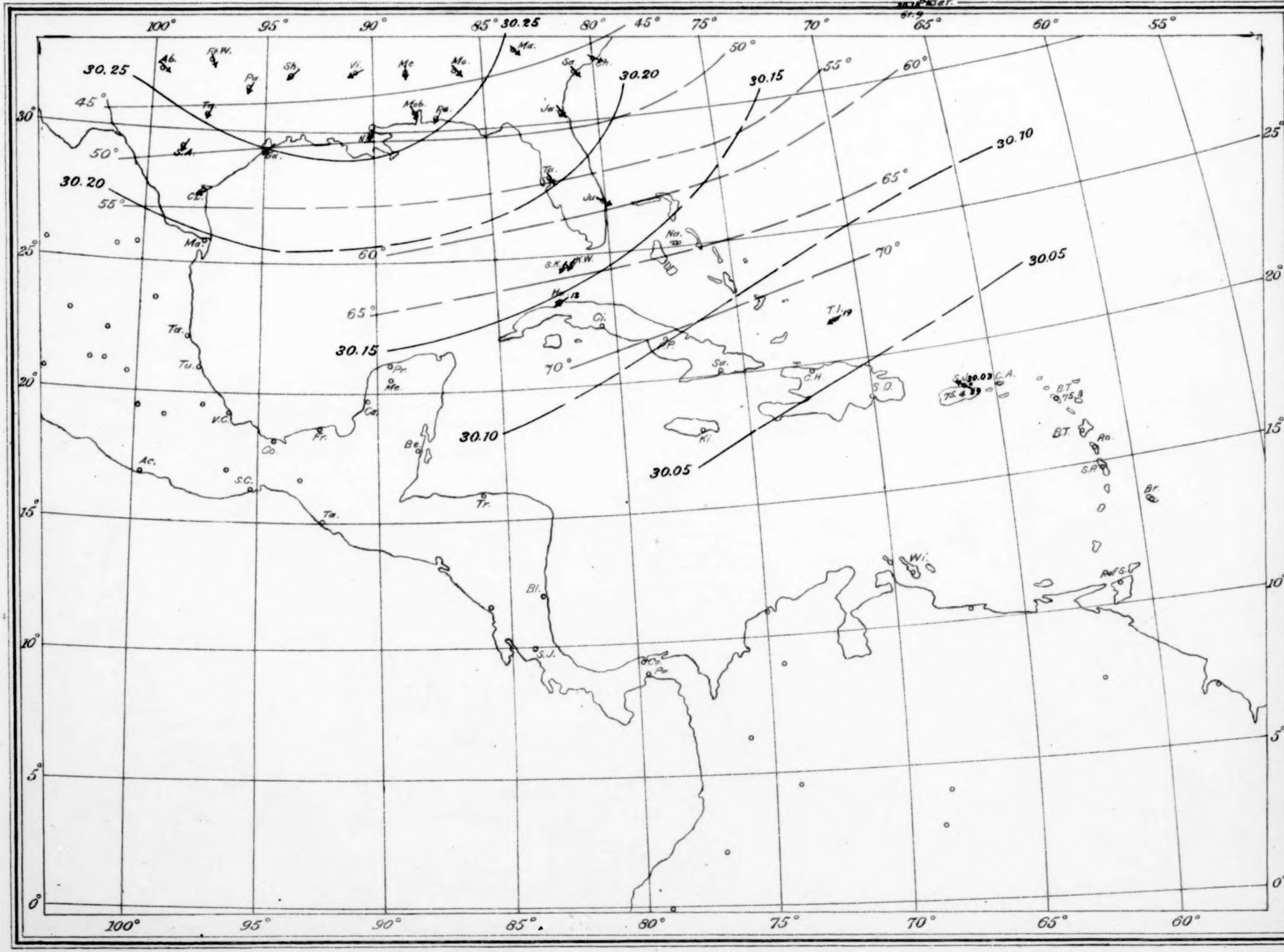


Chart X. Total Snowfall for January, 1905.

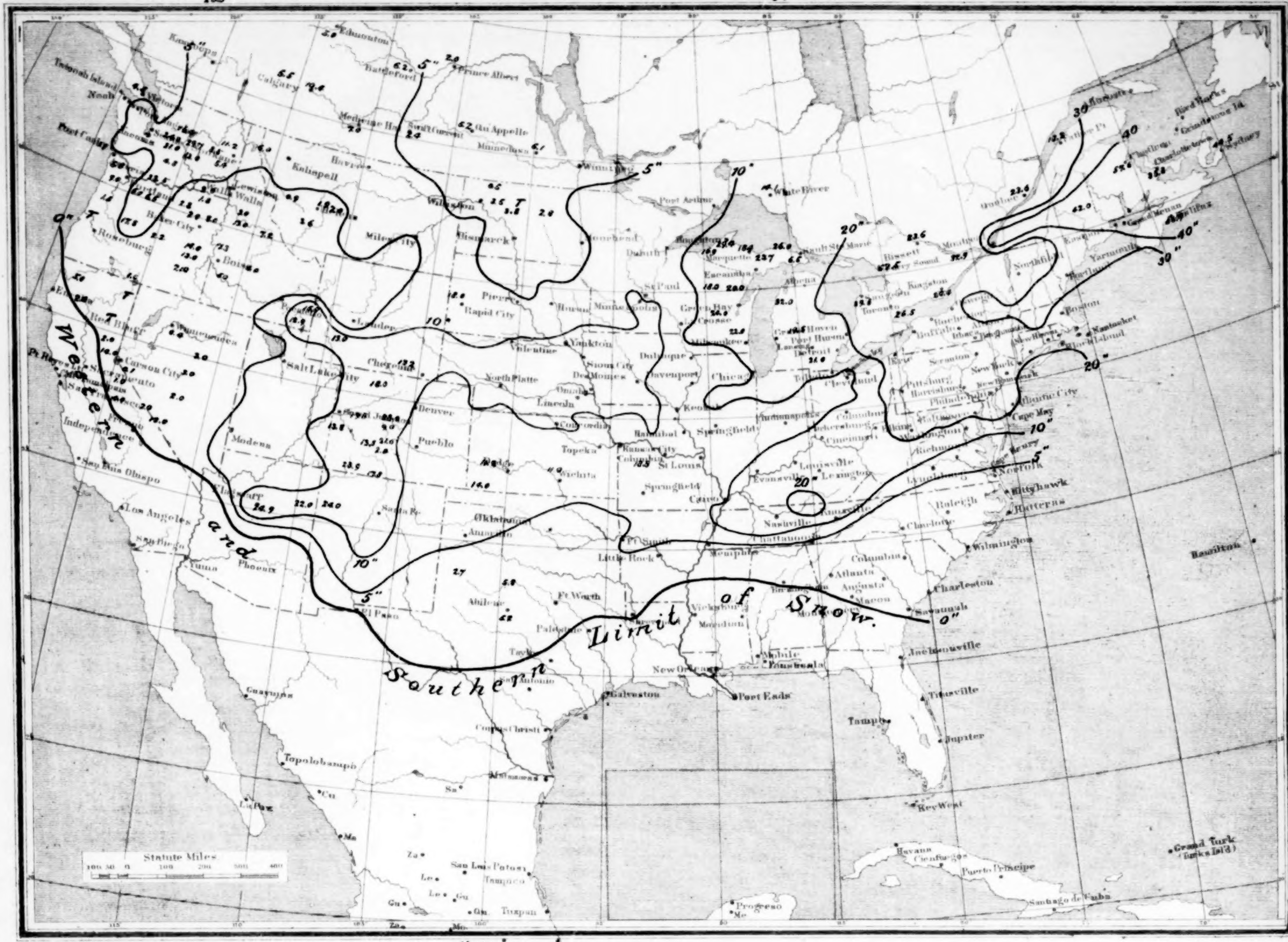


Chart XI. Depth of Snow on Ground, January 31, 1905.

Chart XI. Depth of Snow on Ground, January 31, 1905.